Bee Culture

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Bee Culture

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A work truck stands guard at the entrance to a yard in Saskatchewan, where it spends most of its life as one of a beekeeper's most trusted companions. (photo by Luke Marshall)

FEATURES

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MAILBOX

Look At Nature

In the December, 2004 *Bee Culture* on the subject "Beekeeping Library" I was intrigued by the apparent interest in historic beekeeping books of the 19th and early 20th century. Aside from the fact that the olden bee masters were living in a different age with perhaps fewer of the present day beekeeping problems, they seemed to have an excellent grasp of what was happening in their colonies, because, I suspect, of closer involvement with their bees and nature.

I have an original edition of *Honey Plants of North America* by John H. Lovell published by the A.I. Root Company. It is an amazing compendium of information about honey plants, outdated in some respects, but nonetheless an outstanding example of documentation considering the author did not have the cybernetically advanced and other investigative advantages we have today.

Have we failed to utilize for useful purposes the art of personal communication available through our advanced technology? Perhaps we have in the sense that we are losing personal contact with the world of nature. I think we are becoming more or less dependant upon imaginative recreations in education.

I am an outdoor photographer with a pronounced dissatisfaction with the current penchant to enhance nature photographs with unreal color and composition. Natural scenery has sometimes taken up to four billion years to reach its present development. I think it is demeaning to tamper with what is seen through the camera lens. Good composition is desirable in photographic art and its achievement in respect to nature needs no embellishment.

In the same vein I believe it is our tendency to ignore what evolutionary nature, in her sometimes incomprehensible wisdom, has given to bees to assure their survival. Our old beemasters were merely introducing us to the wonders of creation, not trying to coerce their charges into becoming automatons for profit.

Larry Goltz
Redding, CA

Children & Beekeeping

After years of teaching school and raising our three children on the farm, I became very interested and involved in beekeeping. Now I am the project leader for two of my grandchildren's 4-H group's beekeeping project. I started a website for the children and to encourage other young people to become beekeepers. The website is **www.liberty4Hbees.com**. It has links to other sites both here in the U.S. and some in England and one in Sweden. (Also visit www.petersonsfarm.com.)

This coming Spring our Liberty 4-H beekeeping group hopes to raise some queens. We will document our efforts on the web site.

We are encouraging other young beekeepers to let us know what they are doing.

Ettamarie Peterson
Petaluma, CA

Challenging Dr. Collison

I take issue with the answer to question 18 in Clarence Collison's column in the November issue. The answer propagates a common misconception.

There are numerous comparison studies of instrumentally inseminated queens, IIQs, and naturally mated queens, NMQs, dating from 1946 to the present, that demonstrate similar performance levels in production of honey and brood, and queen longevity. With the advantage of selection and controlled mating, several studies have shown that IIQs out perform NMQs.

The differences in queen performance reported in a few studies may be explained in the varying conditions, treatments and care of queens during rearing,

Continued on Next Page

MAILBOX

pre- and post-insemination care, insufficient semen dosage, and beekeeping management and methodology.

My experience, in the annual establishment of several hundred IIQs in field colonies since 1981 for the New World Carniolan breeding program, is that these have preformed as well or better than their NM sisters.

Two leading researchers who worked extensively with this technique state:

Dr. H.H. Laidlaw, 1987. "Their comparability has been verified numerous times. Contrary results appear to be due to organizational or technical flaws."

Dr. J. Woyke, 1989. "A good method of instrumental insemination must be used before one can compare of instrumentally inseminated with naturally mated queens. Again, there is no point in comparing naturally mated with poorly artificially mated queens."

Sue Cobey
OH State University
Columbus, OH

Enjoying BC

I have enjoyed the magazine tremendously the last two years, thanks to my beekeeping friend Joe Jovanovich. My knowledge and application of the information in your magazine has greatly increased. Joe gave me two years of *Bee Culture* as a gift. Now I will buy two years on my own.

Thanks for the hobbyist's article on Staghorn Sumac. I'm trying it!

Laura Shulenbarger
Spokane, WA

FDA

The topic of what makes a FDA facility has come up again.

All the honey I sell is packaged in my home. I own a small acreage and produce 500 pounds of honey from four two-queen hives.

I do own an extractor, but I use it in my kitchen. In a letter I got from my State Ag Department they say if you own an extractor, you have to register with FDA.

If you have already covered this in a past issue of Bee Culture, let me know and I will buy a back copy.

I asked this question of you before and got no answer.

Kraig Brock
Shepherd, MT

Editor's Note: *All the information you need can be found at www.fda.gov/oc/bioterrorism/bioact.html. Yes, you will have to register.*

INNER COVER

Buzz used to be an inspector. A good one. Andy, the Regional Inspector who taught him did a pretty good job, because Buzz is the cleanest beekeeper I know. And I've seen a lot of beekeeping operations.

I'm not the cleanest beekeeper I know. I should be. Do as I say, not as I do, you know.

I've learned a lot working with Buzz. He keeps coming up with those blinding flashes of common sense that amaze me. What's the cheapest piece of beekeeping equipment – the rock that sets on the cover. The dirtiest piece of beekeeping equipment? The strings from your veil that drag over the top bars of every colony you open. Wash your hands and your tools when you're done. A place for everything and everything in its place (I don't think that's original with Buzz, but it's a rule in his operation).

In his honey house nothing is sticky. Jars there. Empty pails over there. Wax here. Bottles and cases right there. Rows of full pails labeled to date and color and type. Neat, clean and good.

Me, I'm a mess. Stuff here and there and everywhere (check the top of the last hive I worked if you can't find it in the garage, or the basement, or on the deck, maybe the porch). I'm late getting started, it takes longer than I thought, and Good Grief! Now I'm late getting to that meeting, and, I'm in charge of the meeting. Guess what doesn't get done. Almost ever. Yes, cleaning and sorting and putting away. It's disgraceful. It's a mess. And you know, I spend 10 times as much time looking for that . . . whatever . . . than if I had taken just a little time, last time, putting it away.

My dad wasn't like that. And God knows my mother wasn't. I'm just unorganized. That's it. Not lazy.

Well, even if you're nearly perfect in the house cleaning department, here's one thing I learned from Buzz you should be doing this Summer. Get a bucket – one gallon or so, half full of water. Add twice the detergent you need and a half cup of bleach. Get one of those steel springy scraper things they use for dishes. Keep it right in the bucket. Keep it with your bee stuff. Mine's in the garage, Buzz keeps his right on his truck.

When you're done for the day, scrub your hive tool and the outside of your smoker with the scrubber. Get all the honey and propolis and gunk off both tools. Clean, not sticky, no disease and ready for next time. It takes five minutes. It might save you burning a colony, or five. Buzz is right, listen to him. Do as he does, and, I guess, as I say.

•

Bees and almonds are making big news right now. If you're a hobby beekeeper in Vermont or Wisconsin you might not have much interest. Don't be fooled.

Here's some numbers from Blue Diamond to keep in mind. In 2003, almond growers made $2,900/acre, up from the previous record of $2,500 in 1997. These high returns have sparked increased plantings, expected to *exceed* 50,000 new acres each year for the next six to 10 years. The biggest swell will hit in 2007-08, meaning the most bees will be needed the Spring of 2007. Currently there are about 500,000+ acres planted and needing bees. Half of the bees in the U.S. are, right now, in California, getting ready to simply love all those blossoms. Actually, probably more than half are there, what with the losses this Winter, across the U.S.

Last month an article in this magazine quoted pollination brokers and researchers suggesting that almond growers reduce colonies used/acre from the normal (and record $ producing) amount of 2.5/acre to 2.0 or so.

If acres continue to grow to, say, 650,000 or so, by 2008 a *minimum* of 1,300,000 colonies will be needed. At 2½/acre, over 1,600,000 will be needed. There are now, in the U.S. somewhere between a high of 2.6 million to an estimated low (using current estimates of a 40% loss this Winter) of 1.6 million colonies. The USDA's actual colony count comes out the end of this month. This count, of course, is only for those beekeepers who have more than five colonies. In reality, probably only those with more than a couple hundred get involved in this.

This month some colonies are renting for as much as $100 each. And there will be, take your pick: 1) Not nearly enough; 2) Barely enough; 3) At $100 a pop more than needed.

How does this affect that hobby beekeeper in Wisconsin, or me, in Ohio? Well, where do you think all those almond bees will come from? Oh, maybe Mexico, Canada, New Zealand or Australia? Or, mostly U.S. bees, still, but at what price? I suspect all of the above, and all expensive. Starting now, there'll be money in those boxes, and it *won't* be honey.

Pick a warm day this month, and go visit a beehive. You'll be glad you did.

Kim Flottum

Keep It Clean.
Grow Bees.

New Reading For 2005

Covered in Honey-the Amazing Flavors of Varietal Honey by Mani Niall, published by Rodale

Specialty honeys bring premium prices. They offer increased marketing opportunities for beekeepers. Now, there's a new honey book from Rodale that promotes varietal honeys.

Beautifully illustrated with drawings, this book should appeal to the general public. The author is a chef and spokesperson for the National Honey Board, so he has intimate knowledge of his subject. He presents the information in an engaging style, answering all the questions the average consumer might have about honey, bees, and beekeeping.

It's the author's light touch that really works. Instead of giving more information than readers can absorb, he presents selected material in an interesting manner. For example, fun facts like a single bee can only produce 1/12th teaspoon of honey during its lifetime.

Most importantly for beekeepers, the author encourages cooks to use more honey – especially the varietal ones. The book features a hundred innovative recipes for all sorts of dishes. Along with honey buns and other traditional recipes, there are contemporary ones, some of which are made with varietal honey, such as rosemary walnut shortbread. For each recipe, he provides a commentary, and gives a list of special equipment that is needed.

The author devotes an entire chapter to varietal honeys, which could lead to increased demand. In addition, the honey descriptions could be useful when customers ask beekeepers about these kinds of honey. The author provides descriptions for forty-three varietals, including both floral and honeydew honeys. Categorized by the predominant flavor, these include floral/fruity, herbal, spicy, and earthy/strong flavored ones. Among these are eight varietal honeys that are imported even though some of these plants grow in the U.S. This indicates there are potential marketing opportunities for the American-produced varietals. The appendix has a list of sources selling varietal honey.

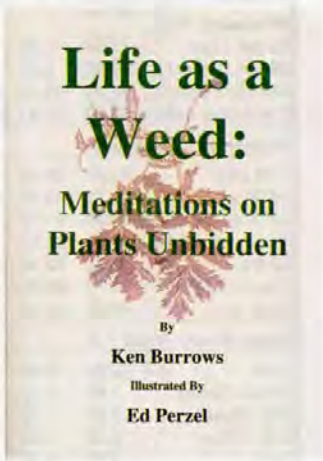
Provided this excellent book is given the exposure it deserves, it could help American beekeepers market their honey.

Connie Krochmal

Life as a Weed: Meditations on Plants Unbidden, by Ken Burrows with illustrations by Ed Perzel, about 200 pages, soft cover, black and white with drawings. Available from Ken Burrows, 9136 Joyce Kilmer Avenue, Charlotte, NC 28213 (kcburrow@email.uncc.edu). $12.95 U.S. plus $2.00 for shipping. The book is printed by Whitney Press, Inc., "specializing in the small and unusual."

This is a collection of 52 essays about weeds, sharing the author's light-hearted curiosity about nature's underclass. The book has a strong conservationist theme, persuading the reader of the fascinations of these alien intruders – unlikely beauties, cures, poisons, aphrodisiacs, the stuff of heroic legend, magic, and spells. The plants are looked at obliquely through anecdote or meditation as the writer recalls garden club encounters, backyard failures, and occasional epiphanies. Readers are encouraged to "enjoy and value their fellows in nature (neighbors as well as plants) instead of trying to kill them." Each short essay is accompanied by Ed Perzels' delightful sketch and an invitation to readers to make sketches and notes of their own.

The book argues that even the most wretched of weeds is rich in interest. The book informs and entertains the reader and may have a tendency to encourage lollygagging, particularly among gardeners who should be preparing their flower beds instead of reading. Each essay concludes with brief botanical notes simple enough to help you and your honey bees identify those contemptuously familiar plants whose names you forget, while still allowing you to intimidate your friends." - *Judy Pendergast*



FEBRUARY – REGIONAL HONEY PRICE REPORT

Just before the holidays we had lunch with one of the biggest beeswax buyers, and sellers in the universe. He said that beeswax was short and the price was tight. Our data here said otherwise and I questioned his opinion. OK. We were wrong. A month later our numbers show he's right, so we're tracking beeswax closely now. Stay tuned.

Region 1. Bulk prices down, pails steady since last month, and both wholesale and retail down. Beeswax up 55% since last month.

Region 2. Bulk unchanged but pails down. Wholesale prices way up since last month, and same for retail. Beeswax up 54%.

Region 3. Bulk prices down since last month, but pails steady. Wholesale steady, but retail prices up. Beeswax up 64%.

Region 4. Bulk prices, pails and wholesale all steady since last month, but retail prices down. Beeswax down 28%.

Region 5. Bulk prices down a bit since last month, but pails and wholesale up. Retail way down, and beeswax unchanged.

Region 6. Bulk prices down sharply, but not as much as pails since last month. Wholesale down some, but retail up. Beeswax down 18%.

Region 7. Bulk and pail prices steady, but wholesale and retail prices up. Beeswax up 34%.

Region 8. Bulk prices down sharply, but pail prices steady. Wholesale steady to up just a bit and retail up steady. Beeswax prices steady.

Region 9. Bulk prices steady this month, but pails, and wholesale up a tad. Retail, however, only steady. Beeswax up 25%.

Region 10. Bulk prices steady but pails drop sharply. Wholesale steady, but retail up a bit. Beeswax way, way up – almost 300%.

Region 11. Bulk prices down some, but pails way down since last month, and wholesale no better. Retail though, steady. Beeswax up 16%.

Region 12. Bulk, pail and wholesale prices down since last month, but retail steady. Beeswax unchanged.

	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	1.04	1.00	1.04	1.25	0.98	0.90	1.21	1.04	1.04	1.18	1.15	1.20	0.90-1.25	1.09	1.18	1.47
55 gal. Amber	0.85	0.80	0.98	0.95	0.72	0.98	1.04	0.98	0.75	1.00	1.25	1.08	0.72-1.25	0.95	1.06	1.31
60# Light (retail)	95.00	116.70	108.74	96.25	112.50	94.25	101.29	98.33	150.00	115.00	140.00	95.00	94.25-150.00	110.25	115.83	101.83
60# Amber (retail)	90.00	108.87	102.40	95.45	99.00	76.00	95.17	102.50	123.33	102.40	130.00	75.20	75.20-130.00	100.03	107.31	95.55
Wholesale - Case Lots																
1/2# 24's	41.87	50.38	42.26	35.80	50.90	35.70	38.04	42.26	42.26	35.76	35.50	34.32	34.32-50.90	40.42	37.47	35.53
1# 24's	53.71	62.28	64.59	52.45	50.00	56.00	58.80	62.40	50.40	71.84	65.95	66.48	50.00-71.84	59.57	57.92	58.41
2# 12's	47.38	61.72	55.59	48.00	54.18	48.00	51.26	58.75	46.50	55.92	45.75	59.44	45.75-61.72	52.71	50.11	51.49
12 oz. Plas. 24's	43.84	61.90	55.28	45.50	52.44	54.00	45.79	50.00	43.20	47.76	60.25	51.44	43.20-61.90	50.95	49.57	48.59
5# 6's	52.21	62.98	63.86	50.80	63.86	55.00	58.88	52.50	63.86	56.43	57.00	53.90	50.80-63.86	57.61	59.73	53.86
Quarts 12's	69.75	100.35	83.63	68.05	74.82	77.33	83.66	76.00	96.00	91.30	84.20	86.64	68.05-100.35	82.64	79.52	76.76
Pints 12's	45.00	49.95	54.04	43.38	41.60	41.33	52.96	44.00	51.00	58.25	54.00	53.94	41.33-58.25	49.12	47.81	45.33
Retail Honey Prices																
1/2#	2.30	2.60	2.49	2.47	1.89	3.00	2.33	1.89	1.85	2.56	2.75	2.25	1.85-3.00	2.37	2.48	2.43
12 oz. Plastic	2.82	3.12	3.25	3.00	3.23	3.00	2.95	3.30	3.10	3.28	3.38	3.01	2.82-3.38	3.12	3.14	3.15
1 lb. Glass	3.00	3.73	4.25	3.63	3.43	4.00	3.51	4.11	3.99	4.05	4.59	3.86	3.00-4.59	3.85	3.75	3.75
2 lb. Glass	6.33	6.21	9.00	5.53	6.20	6.00	9.00	7.25	5.87	6.70	5.97	7.01	5.53-9.00	6.76	6.26	6.13
Pint	5.00	6.28	6.41	5.10	5.25	4.67	5.88	5.38	5.25	6.20	5.09	6.00	4.67-6.41	5.54	5.78	6.46
Quart	9.00	8.55	11.30	7.38	8.15	8.15	10.05	8.42	9.00	11.25	8.58	9.80	7.38-11.30	9.14	8.77	8.71
5 lb. Glass	12.50	13.56	17.36	12.91	12.00	15.00	15.08	15.99	15.95	13.70	13.49	14.20	12.00-17.36	14.31	13.58	12.58
1# Cream	3.88	4.95	5.00	4.35	4.29	3.95	4.78	4.74	4.98	5.33	5.05	4.08	3.88-5.33	4.61	4.59	4.32
1# Comb	4.50	4.43	5.50	5.23	5.40	4.50	5.48	4.99	3.99	5.50	5.00	5.58	3.99-5.58	5.01	4.94	4.13
Ross Round	4.61	3.90	5.50	4.85	5.00	4.50	5.50	4.99	4.61	5.63	6.00	3.99	3.90-6.00	4.92	4.92	4.54
Wax (Light)	2.94	3.08	3.38	1.50	1.23	2.00	3.25	2.50	2.50	3.35	1.95	2.00	1.23-3.38	2.47	1.32	1.60
Wax (Dark)	2.75	2.57	2.51	1.33	1.10	1.38	2.15	2.00	2.00	2.55	1.85	1.63	1.10-2.75	1.98	1.21	1.65
Poll. Fee/Col.	49.00	44.67	51.75	35.00	38.13	40.00	42.57	40.00	51.75	78.00	55.00	61.25	35.00-78.00	48.93	47.97	38.84

RESEARCH REVIEWED

Explaining • Defining • Using

Steve Sheppard

"A cautionary tale of formic acid . . ."

For some old timers, there is at least the memory of when we kept bees without giving a thought to parasitic mites. That time passed and a generation of new beekeepers learned to keep bees alive in the presence of *Varroa destructor*. Strange as it may seem, these folks may soon feel like old-timers and have fond memories of a time when this mite could be conveniently and reliably controlled by placing miticide impregnated plastic strips in their beehives. With the widespread and growing resistance of mites to the active ingredients in Apistan® and Checkmite+® now an unfortunate reality, beekeepers are facing a pest management future where much is uncertain, except that the "good old days" of easy mite control are over.

One of the alternative chemicals used in many countries to combat parasitic honey bee mites is formic acid. Although commonly applied to control *V. destructor* in Canada, formic acid has not been used widely by beekeepers in the U.S., due to difficulties with the availability of registered formulations and handling issues. However, the diminished ability of U.S. beekeepers to control resistant mite populations within their honey bees has served to rekindle interest in formic acid. Fortunately, a number of U.S. researchers have tested various application methods and formic acid formulations in the past few years, borrowing on years of prior research from Europe and Canada. As a result, there exist effective control recommendations and the legal use of formic acid is possible. However, the use of organic acids to control mites in beehives is not without risks to both bees and beekeepers, necessitating careful sifting of reliable from anecdotal reports. Climatological conditions (especially temperature), mite population levels and overall colony health are important factors in whether formic acid will "kill mites and save bees" or invoke some alternative (and undesirable) combination of those words.

An example of research illuminating potential limitations of formic acid treatment can be found in a recent paper by Patti Elzen and colleagues from the USDA-ARS laboratory in Weslaco Texas (Elzen et al., 2004). In the first experiment, Dr. Elzen and her research group tested the effectiveness of a formic acid pad formulation compared to a coumaphos (Checkmite+®) treatment and an untreated control in a Florida apiary. Ten colonies were tested in each of the three groups and, as the colonies had been untreated for the previous year, they were heavily infested at the start of the experiment (> 20 mites found in an ether roll). The experiment started in January and ran for six weeks. Sampling of mites was conducted weekly on the colonies by washing the mites off a sample of bees with alcohol and counting the mites. Curiously, the number of bees actually sampled from the colonies was not reported. Thus, the researchers compared the mite numbers directly and did not provide an infestation rate (number of mites per number of bees). In the second experiment, the researchers evaluated the negative effects of formic acid and coumaphos on bee brood by inspecting the mortality in a selected group of eggs or larvae. This experiment took place in south Texas in March and April and used five colonies per treatment. Details of the location of the eggs/larvae sampled within the brood nest (i.e. distance from the treatment site) were not given. The colonies were tested biweekly for egg/larval mortality over a six week period following initial treatment.

The overall effectiveness of formic acid was considered to be "moderate" by the researchers, with about a 40% reduction in mite levels apparent in an alcohol wash after six weeks. Coumaphos had similar efficacy, providing about a 38% mite reduction. The authors considered this latter result consistent with the designation of this Florida mite population as coumaphos resistant. Interestingly, the untreated control colonies also experienced a 16% reduction in mite level over the six week study.

Based on the second experiment, the researchers also reported a significant difference in brood loss in the formic acid treated colonies during the first week of treatment. About 58% of the selected brood in the formic-treated colonies died in the first week, compared to 15-16% in the control and coumaphos colonies. One of the formic acid treated colonies also superseded its queen during the study. The authors stated that the negative effects of formic acid treatment on brood were obvious. While apparently true, it is difficult to evaluate this aspect of the study because the location of the sampled brood, relative to the distance from treatment site, was not given. Based on the data presented in the study, there is no way to rule out that the formic acid had

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only a very localized negative effect on brood.

Considering the moderate performance of the formic acid formulation used in their experiment, Elzen and colleagues recommend that formic acid may be most effective when used with another control tactic. In other words, the action of a single formic acid pad treatment to produce a 38% reduction in the number of mites found on adult bees was just not good enough. In discussing their results, the authors compared their findings to those reported by previous studies, where formic acid treatment efficacies ranged from 56% to 85%. One question that immediately comes to mind is ...why was there only a 38% reduction in the mite population found in the current study? One of the possible answers could lie in the manner in which the % mite reduction was calculated. The authors reported a 38% reduction in the number of mites found on a sample of adult bees taken after six weeks, compared to the mites found in an initial sample, but no estimation of the total number of mites present in the colonies (before and after treatment) was made. Thus, it is possible that the mite population found in the sealed bee brood was significantly different six weeks after treatment, but those data were not included. In addition, the fact that the colonies used in this test had been untreated for *V. destructor* for more than a year makes it likely that the mite populations were very high. If so, a single formic acid gel pad treatment under Florida conditions may have been "too little, too late" to reduce a very high mite population to a survivable level. Nonetheless, the conclusions of the authors and the cautionary tale they tell are well taken. Further studies of formic acid treatment protocols need to be conducted in various climatic regions of the U.S. and with colonies of varying mite infestation levels to most effectively utilize a formic acid alternative to current U.S. mite control practices. BC

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Elzen, Patti J., David Westervelt and Raymond Lucas. 2004. *Formic acid treatment for control of* Varroa destructor (*Mesostigmata: Varroidae) and safety to Apis mellifera (Hymenoptera: Apidae) under southern United States conditions.* Journal of Economic Entomology, 97:1509-1512.

Mark Winston

The Integration Gap

"What can be done to provide more reliable, comprehensive, and global information to beekeepers about IPM methods?"

First of all, let me relieve your concern that this article is yet another Dr. Winston rant about integrated pest management. Yes, I think we North American beekeepers are using stone-age tactics to deal with pests and diseases. We throw chemicals at our bees just like the troglodyte farmers of the 1950s, and our over-use of antibiotics brings smiles of joy to the pharmaceutical industry.

But, enough of that guilt-inducing stuff. I've been thinking about integrated pest management (IPM) in another way lately, having been reminded by a publication from one of my students about how difficult research involving IPM can be, and expensive. The student was Nathan Rice, currently working at the USDA bee laboratory in Beltsville, Maryland, and the paper was published in the October 2004 issue of the *American Bee Journal*.

It's title: "Integrated Pest Management for the Parasitic Mite *Varroa destructor* (Anderson and Trueman) in Colonies of Honey Bees (*Apis mellifera* L.)." Underlying that mouthful were years of thinking about an experimental design that might demonstrate the efficacy of IPM, more years of actually doing the experiments during the mid to late 1990's, and yet a few more in trying to get the research published.

The concept Nathan developed for this project involved setting up groups of colonies that were managed against *Varroa* in different ways. Fundamentally, he wanted to compare a typical chemically dependent method against various IPM options to determine whether IPM methods could achieve pest management nirvana: control mites economically without heavy use of synthetic chemical pesticides.

His strategy was simple in design but difficult in execution. He chose as a control group the typical mite management paradigm at that time, a Spring and a Fall treatment with Apistan. His experimental treatments involved Spring and Fall treatments that rotated Apistan with thymol, used only thymol in the Spring and Fall, or mixed the use of thymol with two other methods, hygienic queens and screened bottom boards.

He set these colonies up one Spring, and followed their survival, populations, and honey production for about two years. Then, he calculated the product and labor costs for each treatment, and combined that information with the efficacy of *Varroa* control to produce recommendations about the various IPM or chemically addicted systems.

Seems simple, but no one had ever done anything like that before, and even now there are few studies that have attempted this approach. While conceptually elegant, this approach in practice is a research minefield, and its dangers have prevented most researchers from entering.

First, this type of work is expensive. You need at least 10 colonies for each treatment, bare minimum, and the labor involved to assess these colonies carefully is mind-boggling. It's a $75,000 project, most of which goes to salaries for students and technicians, and so right off it requires a well-funded research program.

A second, somewhat delayed research explosion happens towards the end of this type of project, when you realize that one or two of your treatments didn't work. That's not so bad from the beekeeping end, since the loss of 10 or 20 colonies won't break the bank. It's terminal, though, from a data perspective, since you can't do any statistics on zero or one surviving colony to compare that treatment to those that had more robust survival.

Appropriate control colonies are another challenge. The proper control is one in which you don't treat the bees with anything, but practically speaking that's a waste of time and bees, since untreated colonies will all be dead at the end of your two-year experiment. Nevertheless, peer reviewers insist on having the data to demonstrate the obvious.

Unfortunately, we chose to delete that control in favor of adding another treatment, feeling that beekeepers would benefit more from testing another option than killing our colonies. Reviewers skewered the work because of that, the appropriate response scientifically although perhaps not the best response from a beekeeper's point of view.

Economic analyses are another

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"This is a classic integrated pest management approach, rotating chemicals to reduce the likelihood that resistance to any one chemical will develop."

challenge, since most bee scientists are not well-trained in economics. Nathan took the approach of thinking like a beekeeper rather than an economist, and simply added up treatment and labor costs to determine how much a beekeeper would have shelled out per colony for each method.

In spite of these limitations, the work did yield some interesting if tentative results. Not surprisingly Apistan showed the best mite control, since our project was conducted before Apistan resistance arrived in British Columbia. Other methods were not as robust, with around 70% mite control compared to the 99% we saw with Apistan.

The question, of course, is whether 70% control on a consistent basis is enough, and here the results were mixed. Our best treatment for colony survival was one in which we rotated chemicals, treating with thymol in the Spring and Apistan in the Fall.

This is a classic integrated pest management approach, rotating chemicals to reduce the likelihood that resistance to any one chemical will develop. Our results suggest it's a good strategy that provides the best balance between mite control and resistance management. Interestingly, the treatment in which we used thymol in the Spring and Fall, a uni-chemical treatment, fared poorly, with most colonies dead after two years. Thus, a completely "natural" approach is as bad an idea as a totally synthetic one.

Encouragingly, our various IPM treatments that survived generally did as well as the Apistan-only colonies, maintaining similar populations and yielding similar amounts of honey. Thus, IPM methods seem useable from a honey production point of view.

Finally, there's the money. The cheapest treatment was Thymol only, but since almost all of those colonies died that's a non-starter. Apistan only was next, but although colonies survived and did well that option leads to mite resistance. As beekeepers around the world have discovered, that short-term bandaid collapses within five to 10 years.

Our treatments in which we rotated chemicals, particularly using thymol in the Spring and Apistan in the Fall, seemed to strike the best balance between mite control, resistance management, cost, and honey production. Treatments cost $10.42 per year, compared to $11.36 for Apistan-only, with similar productivity. Thus, if any recommendation came out of this project, it was this tentative conclusion that rotating natural and synthetic treatments appeared to be the best system all-around.

But, tentative is the key word here. For example, we don't know that this system would be successful at slowing down or eliminating mite resistance to Apistan. We used only 10 colonies for each treatment, and half of even the Apistan-only colonies were dead after two years, due to queen loss rather than mites. And, our study was done at the fringes of beekeeping territory in North America, and would need to be repeated in other locations to verify its efficacy under different climatic and honey flow conditions.

What can be done to provide more reliable, comprehensive, and global information to beekeepers about IPM methods? Our results were encouraging in suggesting possibilities, but discouraging in the amount of effort and funding required to yield results that can best be described as preliminary and tentative.

Perhaps it's time for a more global approach, a cooperative research program testing similar methods with large numbers of colonies at multiple sites throughout North America. Nothing like this has ever been attempted, although we did do a project once in Canada where we tested queens of similar genetic backgrounds in Ontario and British Columbia.

Imagine the American Bee Research Association hosting a conference on "Envisioning Integrated Pest Management for Honey Bees." The best minds in the beekeeping and research communities would develop protocols for three integrated management systems, to be compared with an agreed-upon control system in a country-wide research project.

Beekeepers in six regions of the United States would donate 80 colonies for each region, 20 for each of the three test treatments and 20 more for the control colonies. Researchers in each area would manage the colonies and measure all the variables over a two-year period.

The end result? My prediction is that an IPM system will come out on top of each study, but it may not be the same system for each region. The output? Management recommendations fine-tuned regionally, and information about a range of options that will be considerably more reliable than the rumor, hearsay, and innuendo that masquerade as knowledge today around disease and pest management.

All it would take is that one commodity that's in shortest supply: cooperation. Working together on a study like this would be a marvelous opportunity to learn from each other, and that might be the best outcome of all. BC

Mark Winston is a Professor at Simon Fraser University, Burnaby, B.C., Canada. He will also be one of the keynote speakers at EAS 2005 in Ohio.

Malcolm T. Sanford

Mexican Beekeeping Seminar Convenes In Tabasco, Part III

"A continuing presence at these meetings is the magazine *Apitec*, a journal of Mexican beekeeping, published by José Pedrón, a veterinarian turned journalist."

In my last two columns discussing the events of the 18th Mexican Beekeeping Seminar (Seminario Americano de Apicultura), I described the situation with respect to the global honey market, chemical treatments for pests and diseases in both Mexico and Argentina, a strengthening Mexico-Canada connection and current status of the Africanized honey bee. Besides these topics, others included collection of propolis, the genetics of hygienic behavior and pollination of chile peppers in greenhouses using stingless bees. Finally, there was a most interesting discussion of importing honey bee queens from California into Mexico. The authors of the latter paper lament the fact that it is virtually impossible to import queens using extant legal procedures, although it is extremely easy to do so (and many are) by circumventing the regulations altogether.

Much of what I have reported was also published in the proceedings ("memorias") of the congress, a 223-page book, containing the papers presented in the main session and given to all participants. Those submitted in English were "freely translated" by the organizing committee into Spanish. The organizing committee consists of a long list of organizations that contributed to this event, both private and public. These include the government of Tabasco state, the secretaries of both Mexican (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA) and Tabascan Agriculture, the national beekeepers association (Unión Nacional de Apicultores), the national Africanized Honey Bee program (Programa Nacional Para El Control De La Abeja Africana), and Tabasco College and Juaréz University.

Each time I travel to Latin America, it is apparent that more and more information on beekeeping is available in Spanish. Not only were these memorias published, but an increasing number of materials in print, video and CD ROM was evident in the exposition area. This is increasingly important not only in Latin America of course, but also in North America given that many beekeepers are routinely employing labor from south of the border.

A continuing presence at these meetings is the magazine *Apitec*, a journal of Mexican beekeeping, published by José Pedrón a veterinarian turned journalist. This 32-page tome is distributed every two months to a growing subscription list and has a large, prestigious editorial board. The May/June 2004 issue contains articles on apitherapy, the workings of the honey bee brain, chemical treatments, and how the U.S.D.A. ARS is improving honey bee breeding through genetics, translated from a press release related to the honey bee genome project.[1] The July/August edition contains information on the first Cuban beekeeping congress (several presentors in Villahermosa had just attended that meeting in Havana), effects of temperature on honey in storage, and a translated piece from *Bee World* (Vol. 84, No. 4) by Dr. Mark Winston on bees and biotechnology (Genetically Modified Organisms or GMOs).

Apitec also publishes a directory (Directorio Apícola Mexicano), which has been updated for the years 2003-2005. This is a magnificent work listing over 160 pages of beekeepers cataloged by states from Aguascalientes to Zacatecas. In addition there are queen breeder, exporter, equipment sections. Finally, there is a comprehensive listing of governmental organizations as well as associations and cooperatives. Anyone interested in finding out more about Mexican beekeeping should acquire this from the publisher. Details on *Apitec* and the directory are provided on its web site where one can see past editions and also read some information on diseases and pests.[2] It's unfortunate the one issue it devoted strictly to those topics has been sold out.

Electronic information in Spanish originating from Mexican apiculture is scarce. The National Beekeeping Association (Unión Nacional de Apicultores) web page needs a lot of work.[3] La Colmena (the hive) billed at the first Mexican Internet resource, information appears to have been last entered several years ago and many of its links are out of date.[4]

Perhaps the most electronic information in Spanish exists in Argentina, which makes sense given the place that country has been recently elevated to in world honey production and exportation. The premier Argentine bee journal is *Espacio Apícola*, this year publishing its 64th edition.[5] Another site worth visiting is that of the *Argentina Beekeepers Society* (*Sociedad Argentina de Apicultores* or S.A.D.A.).[6] This association was established in 1938 and has developed courses to train beekeepers both as beginners and advanced apiculturists. It lobbies for apicultural issues, being a true non-governmental organization or NGO. It publishes both the hive bulletin (*Boletín del Colmenar*), and electronic publication and hive gazette (*Gaceta del Colmenar*). The organization also makes monthly broadcasts on satellite radio that contain both news and educational programming. The web site features news, techniques and a list of links, perhaps most significant are those

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to two of Argentina's apicultural portals. One features breaking news, shortcourses and expert opinion forums.[7] The other boasts an electronic book on beekeeping and also has a link to a bee stamp photo album.[8]

I am disappointed to see that Apinet, Argentina's Instituto Nacional de Tecnologia Agropecuaria's innovative program on beekeeping, appears to no longer be available.[9] I published a review of this extensive site in my *Bee Culture* Digital Column in May of 2000.

A smattering of Spanish information exists in other countries as well. Two international web sites have links and references of international interest. These also feature information from Spain as well Latin America. The first is the Virtual Beekeeping Gallery at Apiservices.com managed by Gilles Ratia from his 100-year-old farmhouse in southwest France. I published a review of it here in January 1999. The site features an excellent review of the beekeeping industries in both Mexico[10] and Argentina.[11] Another is an extremely interesting site known simply as beekeeping links (Enlaces de Apicultura) guided by José Salinas, a Spaniard. [12] It has a huge number of references on the main page, providing a nice global overview of available information resources.

Finally, Spanish speakers can find information for sale in their native language at the Apis Information Resource Center, managed by this author. The information comes packaged in several "modules" and in two formats. One is pure html (web pages) and the other is in a newer format with a search feature known as html help (for Windows computers only). It is possible to see samples of what's available before purchasing on the web site. The information is also available in English.

As I attend beekeeping events in Latin America, I am always impressed with an inherent energy and enthusiasm that I do not often see in similar events in North America. It could be nothing more than age structure. There are many more younger folks in the developing world who are getting involved in beekeeping. In addition, those beginning have not been faced with transitioning from an activity that was mainly "let alone" to one where that is no longer the case, continually being challenged by mites and now in the U.S. (soon in Latin America?) the small hive beetle, *Aethina tumida*.

One thing is certain. I anticipate my next journey south of the border with some eagerness. It is an excellent way to understand better the kind of dynamics that run the global honey industry, and also how the world activity affects beekeeping our "colossus of the north." I hope others will become more international in their orientation. Too few it seems to me miss a great deal when they don't attend these interesting congresses that are literally right on their doorstep. BC

Education CDs and Videos at the exposition.

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FOGGY BOTTOM BREAKDOWN

Bob Brachmann

Does fogging kill mites or just knock them off the bees temporarily?

This is the end of my second season of treating our hives for *Varroa* with 'fogged' food grade mineral oil (fgmo). Previously, from the spring of 2001 to the spring of 2003 the hives were untreated. This then is the fourth year of no treatments except with fgmo. During the last two years colonies were treated approximately every week from mid March through April and then about every month into September.

In my last article I noted that at the end of July (04) I was seeing some pms in two apiaries and was going to follow up with some sampling. These apiaries were both made up of what I'll refer to as 'established' colonies, meaning those that have been established for over a year. On August 2nd I sampled (alcohol wash) three colonies in the Barse yard and three colonies in the California Hill yard. The *Varroa* levels were very high, out of control. I followed this up with three samples taken from a yard made up of 'new' colonies. 'New' colonies are splits made up in the present year from 'established' colonies. The *Varroa* levels in the new colonies were much lower.

The high levels in those yards made up of primarily established colonies was more than enough to convince me to get back to weekly foggings for a period and then to resample the same colonies after several weekly foggings. The following chart shows the results of the samplings.

The results show an increase in the mite lode in the two highly infested yards. It was obvious while taking the second sampling that rather than a large increase in the mite populations, the mite to bee proportion changed largely because of a drop in the bee populations in those heavily infested colonies; they were starting to collapse.

In the Huey yard (all new colonies) the mite levels were fairly low at the time of the first sampling and the levels were reduced slightly by the fogging.

Lets' briefly review my last two years experience with fgmo and let me offer some speculation.

In the Spring of 2003 I fogged sampled colonies twice and samples indicated an over 80% reduction in *Varroa* mite loads on adult bees. In the Spring of 2004 I fogged sampled colonies three times and samples indicated only about a 55% reduction. Why did I get less control with more treatments this Spring? I may be selecting for mites resistant to fgmo foggings. More likely, I think temperature may have been a factor. It was very cool through most of March in Virginia this year and the bees were clustered fairly tightly during these treatments. I wondered at the time if this would limit the effectiveness of the treatments.

In August of 2003 a test with screened bottom boards and sticky boards showed about a doubling in mite drop over a 48 hour period after a fogging. A drop

1st Sampling			2nd Sampling		
8/2 California Hill		treated 8/8,8/14,8/19,8/25		California Hill 8/27	
Hive#	mites/sample	bees/sample	hive#	mites/sample	bees/sample
1	7	131	1	3	103
2	35	136	2	59	125
3	4	98	3	8	135
8/2 Barse		treated 8/8,8/14,8/19,8/25		Barse 8/27	
1	16	112	1	37	145
2	10	128	2	17	101
3	17	140	3	18	154
8/5 Huey (new colonies)		treated 8/5,8/9,8/18		Huey 8/26	
1	2	105	1	2	99
2	4	94	2	3	104
3	4	174	3	2	101

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onto a sticky board does not, however, prove that fgmo fogging killed any mites. It may knock the mites from the bees temporarily but if they aren't killed they can later migrate back to the brood nest. I don't run screened bottom boards.

Does fogging kill mites or just knock them off the bees temporarily? Why did the Spring treatments appear to be much more effective than this Summers series of treatments?

As noted in earlier articles, a part of the mite reduction in the Spring samplings could be the result of increased brood rearing. Those mites that migrate into brood are not available for sampling. As there was some brood present all through both Spring tests I don't believe this would account for such a large reduction though, especially given the phoretic (SMR) behavior exhibited in Russian colonies.

Could the different ages of the mites account for the variation in effectiveness?

Old bees present in colonies at the end of winter often succumb to stresses that young bees easily resist. Just as most of the bees are old at the end of Winter so too are most of the mites. Perhaps old mites succumb to foggings with fgmo while young mites do not.

If fogging with food grade mineral oil does not kill many young mites could it disrupt their reproductive cycle? If it does, with regular fogging, over time a larger percentage of mites would be old mites and, again, old mites may be more susceptible to these treatments than young mites.

What Now?

Treatments

I will surely take substantial losses in my 'established' colonies this winter. 'New' colonies look like they will come through fine once again as will our 'nuc mothers' used in queen rearing. After two years of working with food grade mineral oil I'm convinced it has some efficacy. Several beekeepers in my area are using fgmo with Russian bees and suffering no losses to mites. None of them are running more than sixty colonies though and they are fogging weekly during the active bee season. I can't treat weekly as they are.

Our bees (and my family) have been living 'on the edge' for five years now. Russian bees have allowed us to keep from falling off. I intend to give the bees more help in the future. Formic acid was registered on an emergency basis in New York this year (2004). There are very promising results with oxalic acid in Europe and Canada. I'll be taking a close look at these organic acids.

Resistance

For the last two years I've placed our survivor 'established' colonies near our isolated mating area, attempting to provide the most resistant and hardy drone stock. In the future I intend to sample all strong established colonies in the Spring and place those with the lowest *Varroa* levels as drone source colonies.

Overall I'm very pleased with the Russian lines both in terms of resistance and overall performance. I'll continue with the program established through the Baton Rouge bee lab.

Lastly, we are also looking forward to developing some new methods to help enhance our breeding program. I'll keep you posted on the results of these efforts.

In this and other issues please take note of other beekeepers who are using 'soft', minimal, or no treatments and are working hard to develop resistant, good all around stock. BC

Bob Brachmann has worked as a commercial beekeeper in California and New York, operating his own business since 1987. He sells honey, nucs, pollinates, and raises queens for hisoperation and to sell.

What's In A Name?

Mites Made Easy

Stephen Petersen

It wasn't all that long ago that the name *Varroa destructor* (Anderson) began creeping into bee journals from its first mention in the publication *Experimental and Applied Acarology* in the year 2000. In fact I'd just learned to spell *jacobsoni* with one "i" instead of two and they up and change the name – at least *destructor* is a little easier to spell and is certainly more descriptive of the havoc it has wrought in the West. At first I thought of my college biology professor going on about "lumpers" and "splitters" (respectively referring to those taxonomists who wanted to constrict or expand species criteria) and wondered just what was behind this renaming of the species. Delving in the deep end of the story proved not only to be very interesting but it has some practical potential for some of the bee projects I'm involved with in Southeast Asia.

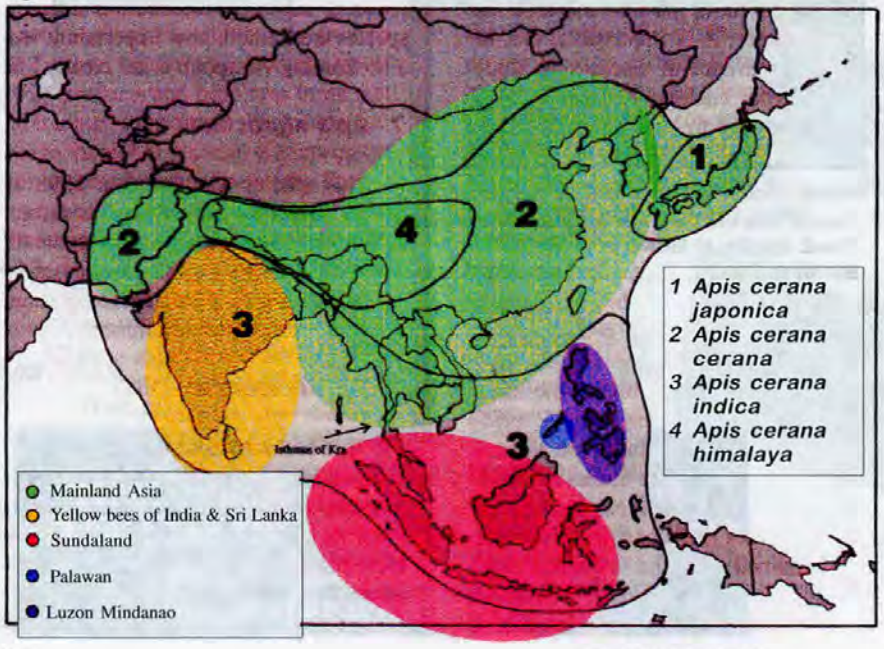
Beekeeping, like any other activity has its own set of axioms, myths and legends; it's part of the culture – dare I say *Bee Culture*? One of these was something that I'd assumed to be true ever since I first found *Varroa* on my bees here in Alaska; ***Varroa* mites come from *cerana* bees – you can't keep *mellifera* bees near *cerana* bees because there is a continuous pool for re-infestation.** This is not quite true – or at least Dr. Denis Anderson (the fellow that made the split back in 2000) has got a pretty strong body of evidence that only one type of mite whose host is a *cerana* bee from a limited geographic area is the "bad guy." The rest of the *Varroa* mites whose hosts are *cerana* bees from different geographical areas are harmless to *mellifera* bees.

Dr. Deborah Smith from the University of Kansas is doing research on the distribution of *cerana* bees in Asia and her findings support the "bad guy" mite premise both through paleogeography (the changes in continental shapes due to Ice Age sea level fluctuations) and mitochondrial DNA (DNA found outside the cell nucleus and not subject to reproductive factors). Let's start with Dr. Smith and some ancient history.

We're all pretty familiar with some of the different races of *Apis mellifera* or the common European Honey bee – there are the Italians, the German black bee, the Caucasians, Carniolans, and on for a total of some 24 races or subspecies. Although not as well studied as their Western counterparts the Eastern hive bee (*Apis cerana*) can be broken down into races in the same fashion. It is important to remember here that members within each species can cross breed but not outside a species – i.e. Carniolans can cross with Italians but *mellifera* cannot cross with *cerana*.

Geographic isolation is one of the factors giving rise to racial differentiation (See Figure 1). Consider the Himalayas – they make a pretty effective bee barrier separating the *cerana* bees of India (*Apis cerana indica*) from those of China (*Apis cerana cerana*) or the East China Sea separating Japan from the mainland allowing for *Apis cerana japonica* to become well adapted to the local situation. It is not too far fetched to assume this geographic isolation worked not only on bee development but also on the mites evolving right alongside the bees. As the mites gradually changed to keep up with the bees they became more and more dependent on that particular bee type to survive. The mites couldn't become too efficient, after all if they kill off their hosts who can they parasitize? Enter mankind (*Homo sapiens* – Latin for *wise man;* now there's a name that should be changed!)

Figure 1.



The story, tale, or legend as I've learned is that when the Trans-Siberian railroad was first completed the Russian Czars sent European honey bees to the Far East (Primoreye) to take advantage of the great forests and their honey potential. They produced vast quantities of honey but they also came into contact with the race of *cerana* bees in the region that harbored the KJ (Korea Japan) subspecies (See Figure 2) of the *Varroa destructor* mite (the "bad guys").

As fate would have it, the keriomones (chemical signals that cause a behavioral change in the members of a different species) of the developing *mellifera* larvae just happened to be the chemical key that caused the KJ *Varroa* mite to reproduce in the larval cells of *mellifera*. Yummy! A new host!

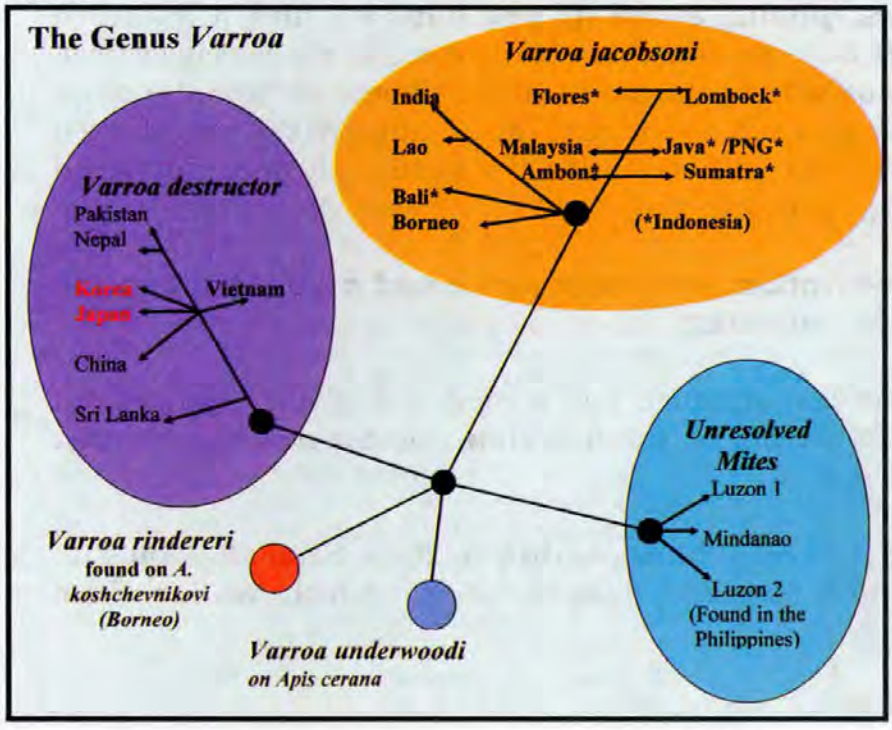
Here I'd like to sow some seeds of doubt. The rest of the story goes on to say that the bees did so well in the Soviet Far East that the Russians brought these "super bees" and the newly acquired mites back to the western side of the Urals into Europe proper. From there the mites spread through Europe causing havoc and eventually made their way to the U.S. in the mid 1980s. My question is – If the mites were so destructive how did the colonies build up in the Russian Far East and produce such tremendous honey crops before the advent of any treatment? I've spoken with Russian beekeepers from Primorie region and they don't seem to be too concerned with *Varroa*. I've asked if there are feral colonies living in the woods- their affirmative answers are probably one reason the USDA Baton Rouge folks went to the Soviet Far East to bring queens back for the mite resistant Russian line now gaining popularity.

Dr. Denis Anderson, right and Dr. Zachary Huang inspect cerana brood.

The other bit of bad luck with these KJ mites is that, before most folks knew of the potential for havoc they represented, they had been sent off on well intentioned aid projects. Japan sent *mellifera* bees to Paraguay, Israel sent *mellifera* bees and mites to Myanmar (Burma), and Taiwan sent *mellifera* to Thailand; basically we're our own worst enemy. Now that we've sent these KJ mites (yes, they're the ones we have such problems with here in the U.S.) to almost every corner of the globe (Hawaii and Australia are still mite free) is there any hope? The answer is a tentative yes- with some major reservations. In a place like the Philippines, according to Dr. Anderson, because there are such relatively small numbers of *mellifera* beekeepers it may be possible to eradicate the mite and, provided there is no further introduction of *mellifera*, maintain a mite free zone. According to Dr. Anderson the mites currently existing on the Philippine *cerana* bees cannot reproduce on *mellifera*. Nor can KJ mites reproduce on Philippine *cerana* bees.

It would also be possible in an island nation like Indonesia with few beekeepers and colonies to eradicate mites on an island by island basis. Well developed *mellifera* keeping countries like Thailand present quite a challenge – there are more than 250,000 colonies across the country and an excellent road system facilitates migratory beekeeping. It would be much more difficult to eradicate mites on such a large scale. The United States is beyond the pale here – we've got to keep looking for long term genetic resistance solutions while at the same time maintaining the industry with short-term chemical fixes. More research into Asian mites may somewhere down the line help us to solve problems at home. In the meantime another threat – *Tropilaelaps clareae*, waits on the horizon. BC

Figure 2.



Stephen Petersen keeps bees in Alaska during the Summer and escapes to warmer climates to engage in beekeeping development projects in Southeast Asia during the Winter.

The Biology Of Increase

Larry Connor

A look at what happens biologically with different ways of increasing colony numbers.

Beekeepers usually evaluate different ways of starting and expanding colony numbers based on costs and risk of adding diseases and mites to an operation. By doing this they may overlook one overriding aspect of starting colonies, the basic bee behavior and biology typical of each method.

It should be very clear to even the newest beekeeper that there are key differences between an established colony and a package colony containing two or three pounds of bees and a new queen. In this article we will review some of these key biological differences.

Swarms

The reproductive unit for the colony is the swarm, consisting of about half the adult bee population and a queen, either the old queen or a daughter queen and some drones go with the swarm.

Multiple triggers must be set off for a colony to swarm. General beekeeping conditions are usually very good, with abundant forage. Colony populations apparently reach a level that queen pheromone is being diluted to a level that queen cell formation begins – swarm cells – the number of cells depending upon the genetic programming of the hive. Some colonies produce dozens of swarm cells, but not all of these cells become queens.

Worker bees must be stimulated to change the queen's behavior. The queen is fed less and exercised – actually stimulated to move about the combs – to reduce her body mass so she will be able to fly. In the event the queen cannot fly – say her wing has been clipped – then a daughter queen will leave with the swarm several days later.

Swarms issue from colonies when the queen cells are sealed, days before the first virgin queens emerge. During this time, additional worker bees emerge and the daughter queen (or queens if unmated virgins) leave with the secondary swarm.

This may end the swarming instinct there, but not necessarily as some colonies continue to swarm, issuing three or four swarms total and rarely even more.

Crowding adds to the swarming instinct trigger, as does a lack of comb space for the queen to lay into. Ventilation also plays a role. Most of these factors relate back to the level of queen pheromone in one way or another, and are strongly influenced by weather. If a good buildup period is abruptly ended by a period of cold damp weather, the cells intended for swarming may serve as supersedure cells – the behavior seems fluid and is not committed to just one outcome.

The usual conditions of swarming include a large population of young nurse bees, abundant food entering the hive, and a vigorous queen. Biologically this sets the newly nested swarm to immediately begin wax production because the worker bees leave with a honey stomach filled with honey, the raw materials of wax. If there is no comb at the new home, new comb must be built immediately. For this reason, beekeepers learn that swarms are good comb building units, building large areas of worker brood comb in a short time period. Thus many beekeepers install swarms onto brood boxes containing all or nearly all foundation, plastic or wax, and expect rapid comb building. Sometimes the swarm does not like this choice of the beekeeper and leaves. This may be due to continued incoming food supplies. The addition of one frame of drawn comb may solve his potential issue.

If the old queen leaves with the swarm, she will help build the new colony's population, and is most likely replaced through supersedure during the honey flow later that same season. This replacement is often missed by the beekeeper, since this is a time period most beekeepers do not enter the broodnest, and the supersedure cells are not seen.

Late season swarms, tertiary and later swarms are often captured, but have little value to the beekeeper.

The bees are chewing and adding new wax to the edge of the comb as part of the comb building process.

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Queen on bare foundation one month after package installation.

Instead of being treated as a new colony during the remaining season and then lost over the winter, they can easily be shaken in front of a weak colony or a nucleus colony and used to supplement the bee population. By shaking the bees at the entrance of he hive, fighting between the two colonies rarely occurs. If the swarm's bees are filled with honey, they may be respected as returning foragers.

About one out of five or six natural swarms actually survives to reach its first year anniversary. Swarms will always select a nest site previously occupied by a colony, where existing wax comb eliminates a huge investment of energy required from the colony's nectar gathering. Wax secretion and comb building require the energy of the foragers that gather the nectar, the house bees that secrete the wax, and the comb builders that chew the wax scales into soften bits that are added to the growing comb. If all these bees are able to concentrate only on foraging and nectar processing, the colony will store supplies of honey adequate for Winter survival.

Package Bees

Beekeepers are likely to call a package of bees an "artificial swarm" because a three-pound package contains about 10,000 bees and a queen, about the same as a smaller than average sized swarm.

When we compare natural swarms and package bees, there are many similarities. Like a swarm, package colonies should contain large numbers of young worker bees, shaken from the brood nest and without a large number of older forager bees or more than a few hundred drones. (Drones will be on outer brood combs, so it is nearly impossible able to shake bees from a healthy, vigorous colony without including young drones as well).

The advantage of young bees in package colonies is expressed in several ways. First, they also must take on the wax making and comb building chores of the new home. Second, if anything happens to the queen, these worker bees must stay alive until a new queen is secured and installed. Without active brood rearing, these young bees will behave like Winter bees, and remain alive far longer than the predicted six week adult life of Summer workers. I have personally seen package bees from a well-made package containing abundant young bees remain alive for two or three months while the beekeeper (that would be me!) fussed installing replacement queens on frames of emerging brood taken from other colonies.

To me, the biggest difference between swarms and package bees is the makeup of the queen. In swarms the queen and the bees are genetically related. If the old queen is involved, the workers are her daughters. If a young queen, the workers and the queen are sisters. They are genetically related and quite familiar with each other.

Package colonies are often shaken in one beeyard and a queen from a mating area dropped into the cage, fastened with a wire or a strip of aluminum to allow her to become introduced to the bees while in transit. Since most packages are shaken midweek and placed into trucks or trailers for weekend delivery, the fresh package will have a queen in a cage prior to introduction for 48-72 hours at most before the package is installed. While this works well in most cases, it does contribute to queen installation failures in some packages. Keeping the queen inside the cage for a few extra days may benefit the colony in the long run by helping her pheromones to become evenly and adequately spread through the colony. The bees have plenty of work to do with comb building, pollen and nectar foraging, and cleaning up inside the new nest. The delay of egg laying by the queen for 48-72 additional hours will be far better than waiting to introduce a replacement queen a week later, only to go through the same thing all over again.

Another difference is that package worker bees are not engorged with honey. They may have some incoming nectar or syrup from the feed can, but they need to be fed heavily upon installation for the colony to build the same amount of comb a swarm would build in nature.

From old USDA studies during the 1930s we know that package colonies suffer high queen losses during the first season, with about one third or more of all new queens being replaced during this interval. This is often attributed to poor queen rearing conditions, but it seems to me that there may be a biological imperative to replace queens in colonies that have gone from swarm or package size to full production colonies in a few months. There may be a pheromonal trigger that is set during the nectar flow that stimulates cell formation at this time. While the queen may be young by the calendar, she may exhibit properties of age or physiological fatigue reducing pheromone levels that bees detect and that inhibits queen cell formation. I suggest this would be an excellent research subject.

The Nucleus Colony

I don't know when the first beekeeper mechanically divided one colony into two or more, but the event marked a significant milestone in beekeeping. Pulling a comb of brood and bees from a colony and letting the new colony raise a queen forms a miniature hive, or

nucleus colony. They are called nucs, nooks, nukes, and other names. The movable frame hive made the formation of such units relatively simple.

Writing from a Northern perspective, the nucleus colony is an excellent way to start a new colony, and perhaps preferable for the new beekeeper lacking hive visiting skills such as queen checking and requeening. Much of the work is done by an existing beekeeper, one experienced (hopefully) in the simple but fine art of making up nucleus colonies.

Biologically, a nucleus colony is a full, balanced colony. It's only mandate is to grow in size and produce a crop of honey for itself and the beekeeper. Given a young queen, it should be a viable unit by midseason and have a high success rate. "Blowouts", colonies that experience queen failures, are easily stacked on top of a strong colony and the bees and equipment kept in production.

But the nucleus colony is not a just for the northern beekeeper. It is the universal form of increase among commercial beekeepers I know. A few use assembly-line operations that blow bees out of the hive, pull out three or four frames of brood and fill each box with drawn comb, food stores and foundation. To this a set volume of worker bees are added and so is a queen cell, ripe and ready to emerge. This is ideal when you have semi truck loads of increase colonies to make up from over wintered colonies in a southern location.

Gearing way back in scale, the small beekeeper with a dozen or more colonies may want to make up as many or more nucleus colonies each year for increase, for replacement hives, and perhaps a few for sale.

I am not aware of standards for a nucleus colony. Some beekeepers make up and sell nucleus colonies with a single frame of brood and bees, and offer these to other beekeepers or use them in pollination. This is not adequate for increase or pollination, in my opinion, and is very risky biologically. It represents a possible breach of some informal code of ethics all beekeepers should follow.

In my neighborhood, if I am going to pay $75 to $95 for a nucleus colony, I want to see at least three and preferably four frames of brood, most of it sealed and emerging, a laying queen (either purchased from a distant producer or mated in the nucleus itself), and a total of five frames (foundation is not as preferable as drawn comb).

Brood combs should be in good condition, and relatively young. Nucleus colonies should NOT be a place to get rid of substandard combs with broken pieces, that are mouse chewed, wax moth weakened and exposed to far more pesticide and acaracide than any of us want to know about.

The queens should be purchased from a known producer early in the season (say dandelion time), or raised from the beekeeper's breeder during fruit bloom.

For the beekeeper making up nucleus colonies, one of the great benefits is the reduction of over-wintered colony populations so they are less likely to swarm. This actually cuts management time for the beekeeper (not having to inspect as often and cutting cells on some old-fashioned swarm control scheme).

At this time of year, I do not recommend that beekeepers let the nucleus raise a queen cell and let it mate. This delays brood rearing by nearly a month, and sets the colony back at a critical time of buildup. By adding a mated queen or even a queen cell, the colony will be up and growing in less than two weeks at the outside. Here in New England, a colony started in April will be ready for sale in May, and should grow rapidly during fruit bloom so it will be ready for the second box of combs in late May and ready for supers for nectar soon thereafter. If, of course, the season cooperates.

Because of the use of old combs, nucleus colonies have the greatest risk of transmitting disease. And pesticide contaminated combs are not welcomed anywhere. Untreated colonies will carry a mite load, ready to explode at the worst possible time.

Buyers should ask lots of questions about the prior conditions of the bee colonies used to make up nucleus colonies, their disease and mite history and treatments, and refuse to purchase any nucleus units with broken, damaged combs.

Full Colony Increase

The simplest way to make a full colony increase is to split a two-chamber hive into two hives, adding a queen or queen cell to the queenless part, and moving the bees to a new location. These divides are sometimes done over boards or double screens, giving the top colony heat support from the colony below.

Another successful way to make Summer increase (June or later here in New England, but earlier as you move to southern locations), is to pull frames of brood and bees from multiple colonies and make up colonies consisting of five to seven frames of mostly sealed brood, pollen, honey and an empty comb or two. To this, add a newly mated queen or queen cell. With mated queens, these full colony increase colonies often explode! In a few days you may want to put on a second chamber and prepare for a Summer flow. If you are in an area where purple loosestrife is a midsummer flow, or where you can pretty well count on a goldenrod flow, the use of Summer increase with a full colony unit is a great way to get good queen cells from desired stock and test them for honey production before you put them to bed for the Winter.

Mixing frames of brood and bees (I do not observe workers fighting when I move the bees into a new box) allows the beekeeper to equalize colony size (two frames from colony one, none from two, one from three, three from four, etc.). If you find a colony with swarm cells, use them! Requeening is always a choice you may make later in the season.

In summary, the beekeeper is faced with different options for increasing colony numbers each season. Keeping the biological perspective is an excellent way for a new or experienced beekeeper to decide which method to use for growing his or her operation. BC

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Selling Nucs

A Primer For Selling A Small Colony

Kim Flottum

The 2005 season promises to be, at best, interesting, and at worst, worse than 2004 relative to honey prices at the commodity and even retail market. And even if the astonishing bee loss predictions are wrong by half, there will be lots of empty wood this Spring. Those who produce honey will need to increase production to stay even, and those who pollinate later in the season will need those boxes filled with bees. And there's always those who want to expand, and many just starting that will want bees this Spring.

After analyzing all these factors, some beekeepers may decide that, because of an uncertain honey market come Fall due to increasing low-cost imports, the best money to be made this year is in selling bees, rather than their services or their products.

But not just bees, rather 'good' bees. Bees that are better than a run-of-the-mill package. Selling nucs is a viable way to accomplish this.

Packages, along with their non-resident and often fickle queens are always a gamble, especially for less experienced beekeepers. I compare them to the 'starter kit' approach. Moreover, packages are fraught with the most troubles and cause sellers the most problems after the sale.

Nucs, on the other hand, are the already assembled equipment approach, with a resident queen already proven productive, of known heritage, and most (if not quite all) of the bumps out of the way.

However, though many experienced beekeepers routinely make their own splits, selling skills aren't generally taught in the books and opportunities for additional income can be lost. Moreover, careless mistakes, splipshod techniques and major and minor goofs, when they are for your operation, are acceptable. When selling a product they are not.

Let's be perfectly clear – this is about SELLING nucs this Spring, not how to make splits. You need to know how, already, to take a split, or two, or three from a strong, healthy, overwintered colony. However, the next step of this enterprise has been, unfortunately, a much overlooked part of a beekeeper's education. And too often novice buyers don't know the right questions to ask, while experienced sellers are reluctant, or unable to share all they know or do all they can.

"Any box with bees will be in demand this Spring, and sell for top dollar."

And right off, this isn't how to do this the *cheapest* way possible, whether producing or buying. Rather we focus on the *healthiest* way possible. No short cuts, no junk equipment, no disease sharing, no cheating allowed. OK?

First, do an honest evaluation of the colonies you're going to draw your nucs from. This month this is easy if you're down south, but up north it's generally more difficult. Nevertheless, do a good job. You know the mite load you have from exams last Fall, tracheal mites should be controlled by grease or a resistant variety and any other disease is *always* controlled – with resistant varieties or drugs. You should also know if your colonies are (or may be) harboring mites resistant to one or both of the hard chemicals. To know, and not share that information is tantamount to fraud in my opinion, and you should be smacked if you do.

Measure brood, both open and sealed (if any), and bees in every colony you will split. Of course the type of bees you have will determine the rate and amount of brood that *will* be produced in the next two months, but an evaluation now is necessary to determine queen and colony health. This, obviously, so you can make an estimate of how many nucs of the size you are going to sell that you will have available. You'll need to do this once more before you actually make splits. That's when you adjust, if necessary, the proposed number of splits you'll be able to make, and sell.

Given a choice, a four- or five-frame nuc is the best product to produce. Those size boxes are readily available, or are easily made from existing equipment (i.e. placing a divider in a 10-frame super for two four- or five-frame units, with separate entrances), and are large enough for even a beginner to make work.

If at all possible, both deep and medium splits should be produced, at about a 7:3 ratio (based on equipment sales in the next year or two). If you don't have brood in mediums now, right now is the time to start for next year. I predict that in three to five years the hobby/sideline market will be 50% all mediums, and even more in eight-frames. Take note.

Absolutely the oldest frame in any brood box you own is three years old or less, right? You have been changing out brood comb on a three-year rotation, right? Well, that's the oldest frame you should sell. Two years old is better. One year is best. You should know, and your buyers will be asking you that. They know that the newer the frame (or at least the comb), the less contaminants there will be in it. Pesticides, dis-

ease, dirt, junk.

Ah, queens. Do you install to the customer's request? I suggest this is the best way to go. Use your own? (But then, locally produced are usually better than something from somewhere else.) Or, do you buy bulk, cheap, and sell high?

Successfully introduced queens of the customer's choosing has a value far greater in that new nuc than that generic Italian, from wherever. And any installed queen is better than hoping a second year beekeeper handles their own installation correctly. The obvious compromise is to have two or three choices available, all good but different. For instance, a good mix would be some with Italian background, some with Carniolan, some ***PURE*** Russian, and something else – maybe Buckfast, Survivor, or your own if possible. All, of course, from producers with mite and disease resistance programs in place. Don't skimp here. Top dollar queens from producers who strive for these traits are worth every penny, when you can find them. Remember, a bad queen never gets better, and a cheap queen is exactly that.

Containers. This can get tricky, but here's a thought. Raise the nucs in a container you will keep to use again (I call them growers), but sell them in a one-way container.

Here's how. Start with your own four- or five-frame boxes, or a 10-frame box divided and empty. Get as many as you need. Maybe even buy some commercial grade deeps and mediums just for the purpose. After all, a deep is a deep and you'll use it anyway for something. Get all these 'growers' ready before you make your splits, and split into these. They allow easy feeding and moving and stacking while growing, plus they're durable and long lasting. Another thought . . . paint them all some weird color so you *always* know that *that* box is made to grow nucs in . . . no looking through stacks and stacks to find one.

The readily available cardboard or plastic nuc boxes are excellent for this, and make good business sense.

Frames. If this is the first time you'll be doing this the frames you use are the frames you have. But, if you're pulling every year from existing honey producing colonies, what are you using, and, do they fit in the boxes you're going to put them in? Find out. Since part of the price of the nuc you'll be selling includes the price of the frames that go along, why get the cheapest, but most-work-related (i.e. you have to put them together) frames, when preassembled plastic or wood-frame frames are readily available? Why indeed! Standardize. Standardize. Standardize. Now, here's another thought. If you are considering frame exchange as part of your business, here's where you need to pay attention. It works like this – bring me five, I send five home with you. But, bring five what? My thought – five brand new, right out of the box frames *you* specify. Pierco, Mann Lake, Rossman, whoever you use. Nothing used, old, or junk. Those cheap frames you get will, I promise, be the most expensive frames you ever buy. Remember. *Only* new frames in exchange.

> ***"Pricing depends on competition, demand, quality, quantity, health, history, customization, service and availability."***

Of course, all this presumes using plastic foundation. That's a given. The exception to this is by special order, like queens, certainly. At additional cost, but it's doable. Keep the customer happy.

You'll need to develop a frame introduction, use, and rotation schedule into your growers for convenience. Date the top bar when you put one in so you always know how old it (or the comb) is, and can move it out (or at least replace the wax) on a routine schedule. Moreover, this shows the buyer that there is a renewal program in place that they can count on.

Now. You've got to consider promotion (letting people know you will have nucs for sale in the Spring), which includes a description of what you'll have, when you'll have them, and of course prices.

We've addressed the size of the nuc you intend to sell – let's say you'll have five-frames, with three - four frames of (mostly) sealed and some open brood (say 3:1), and enough bees to care and cover, plus honey and pollen all on relatively new, disease free comb. You'll have them ready to sell on or about June 1 (pick a date you think they'll be as ready as you want them, then fudge it by a week early and late – depending on the weather and ability to build up).

And they'll cost . . . ? Well, let's see. You're selling a small, but established colony with about three pounds of bees, open and sealed brood, an established queen of known heritage with newer frames with drawn comb, honey and pollen. Plus, you live just down the road and your customers can call, and, what's most important here, is that you know what they bought, and that

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the possibility of a beginner screwing up the queen, or feeding, or whatever is greatly reduced. Compare this to that three pound starter kit.

So. Packages are selling for $40 or so for a two pounder, and $50 for a three pounder. That includes a queen of essentially no choosing. And doesn't include freight. So add a few bucks to that – $60 for a three pound package with a queen is a good average for one - five packages.

Advertised prices for nucs in the January magazines were between $60 and $75 for four and five frames. What's wrong with that price? Too low? Perhaps. Maybe. But there's more here than meets the eye. And that's *perceived* value.

Bees are bees are bees, according to some. And, a nuc isn't available as early as a package. The logic of both of these is, you'll agree, seriously flawed. That doesn't stop it from showing up though. Two thoughts. Ignore it and find customers who know the value, or, sell packages, too. There's a thought. Cover all the bases.

While you're at it, what about selling HFCS in five-gallon pails to feed. And pail feeders. Maybe protein patties, too. Just a thought.

Medications. You need to do some things here, to be fair to your customers. (I know, we haven't finished with prices yet, just wait.) Be up front with the medications that have visited those frames, and your bees have seen. Terra for AFB prevention or control? Anything else? Checkmite+ or Apistan? Good control? What about SHB? Sharing resistant mites, SHB, or resistant AFB isn't a good idea. Actually, it's a terrible idea. Don't do it. But, do share the history of those frames with the buyer. Be fair.

Back to pricing. Previous medication history may affect the price – maybe even the sale. What about Fumidil-B? You really should be feeding that to protect your fragile nuc and that new queen. But ask the customer first. Yes, customize this nuc for that customer. Do they want it treated? Will they treat? What if Nosema hits and the queen goes? Who does what then? Is there some agreement if a buyer says "No Drugs," and then the colony dies or the queen takes a powder?

Conversely, what's the deal when even those 'good' bees superceded that queen and the colony goes quenless. The customer doesn't care if it's the queen, the bees, the chemicals, the weather or a hive tool – it's your fault. How do you fix that? I wouldn't, fist, offer to replace the queen. Rather, I'd replace the whole nuc with one that's working. Yes, perhaps I am crazy but that's what I'd want, and ask for. Definitely replace the queen, and maybe throw in a brood frame, just to help. Be fair.

This all is more than most sellers are willing to do. But then they're selling a commodity, and you're not. And that affects the price. Of course you can simply say this is what I have, what I've done and what it costs – take it or leave it. Mostly, there's more customers than available nucs so it's a seller's market. They'll take anything that stings and flies. But, what about next year? Being careful and fair when you don't need to is good business, in my book anyway.

All of these factor into the price – competition, demand, quality, quantity, health, history, pre-sale customization, after-sale service, timing, and availability.

OK. Price. Somewhere between $75 - $100. No less than $75. Certainly. Compared to a package, that's cheap. And, when you consider the risk *you* take, the time and equipment invested, $100 is a fair price. If somebody said I've got a healthy, clean, five-framer, with three to four frames of bees and brood, with exactly the queen you want, established and laying, all on five, three-year-old or less frames, in a cardboard nuc box ready to install in your equipment, and, if there's a problem, please call – I'd pay $100. Tomorrow.

If you've got 20 colonies and get .75 splits/colony, that gives you 15 nucs to sell for between $1,200-$1,500 income. That's a conservative estimate. With 1.5 nucs/colony that figure can go to over $3,000. Figure the difference if honey hits $.60/lb this Fall.

Yes, nucs may be the way to go this year. If you're selling, do it right, and if you're buying, ask all the right questions. BC

James E. Tew

So You Just Bought Three Colony Splits

Getting started in beekeeping

The common ways to get started in beekeeping are: buy a package of bees, hive a swarm, buy an established colony of bees, or buy part of a colony of bees – a split. Each of these procedures has both disadvantages and advantages, but I want to discuss an increasingly important way to either start beekeeping or to increase colony numbers - colony splits.

No guarantees

When I buy a package, I normally specify the size I want. Then I pay a comparable price. For many years, a 3# package has been the common size, but increasingly, the 2# package is becoming more common. Costs and availability are the reasons.

But with the other ways for starting beekeeping, nearly everything varies. When I get a swarm call it can be for a large bunch of bees, but more often it is for a smallish swarm. No guarantees. It may be high or it may be gone by the time you get there. So, maybe I'll buy an established colony? How strong is it? What's the condition of the equipment? Any diseases? Buying a hive is much like buying any live animal. When making such a purchase, there are some basic standards, but there is no precision – no exactness - to the purchasing technique. Colony splits fall into this category.

Okay, so I'm a new beekeeper

Okay, so let's say that I'm a new beekeeper – lots of energy and enthusiasm, but not much experience. At a local association meeting I met a reputable beekeeper who is willing to sell me three splits from his colonies. He wants $65 per split. At first that sounds like a lot, but when I consider the current price of a 3# package plus shipping, I suppose the price is pretty much in line. Roughly, the splits will be two frames of honey and pollen and two frames of both uncapped and capped brood and adult bees to cover; plus another 1 -1½ pounds of bees that he will shake into the splits. The splits will each have a new queen.

He says that I can help with the split procedure so I can see what I am getting for my money, but I can't take time from my job to be there. I will pick them up when he calls me – probably within a couple of weeks. He, too, has another fulltime job. So now I wait for the call. Other beekeepers have told me that I should be assembling equipment and preparing for the bees' arrival during this period. I assemble one complete hive for each of my three future splits. Others have told me that I should prepare yet a second deep to put on in late spring. I may or may not need this, but it's better to be prepared. Overall, I feel that I am in pretty good shape. Like expectant parents, I continue to wait.

While shopping at Kroger....

While grocery shopping, I ran into another fellow whom I had seen at one of the three bee meetings I have already attended. We spoke and I told him of my pending purchase of three 4-frame splits within a few weeks. He asks if I shopped around before making the agreement. No, I did not. I was happy to just to find one person who would sell to me. *(Am I doing this right?)* He asks if I know anything about the seller's disease history. Nope, I didn't know I should have asked that. At this point, who should I ask? I begin to feel my sense of preparedness slipping away. Maybe the state apiarist should be contacted. Get his number from your extension person. *(This is turning into a headache – plus I really want the splits.)* I then decide to cut the confusion and to phone my seller with the question. I trusted him before and have no reason not to continue to trust him and I already know how to contact him.

He's clean

After a leaving a couple of phone messages, I get the return

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call that my seller has been inspected annually and has always been clean of American foulbrood. Of course, he has had to treat for *Varroa*, but by using soft chemicals he has been able to keep his pest population down. He has not used strips in several years. Initially, he treated for tracheal mites, but he has now stopped doing that. While his chemical program was not initially important to me, I feel better knowing the splits have been treated – but not over-treated.

Then the tables turn just a bit. After I take possession of the splits, the seller tells me I should contact my state apiarist and register them. It will only cost a small amount and the inspectors are good sources of advice and recommendations when they inspect the bees. Now it's somewhat funny that I am the one, not the seller, who is unregistered and uninspected. I will take care of this as soon as I get the bees.

The call

"Come for them tomorrow." The weather has cooperated and happily, all is on schedule. In a way, it's good that I can't go for them until tomorrow afternoon. A late afternoon move will give the bees an overnight rest before taking orientation flights. They will have settled some.

Should I close the lid of my trunk or not? Does one travel with hives inside the car? I decide, and others concur, that I will move them in the trunk but leave the trunk lid ajar. That's my plan.

Bees, bees, bees, everywhere

At my bee provider's bee house (actually a garage minus cars), there are bees flying everywhere. It's like one giant swarm in the air. The smell of smoke hangs in the air. Back behind the garage, I can see about 20 hives and in the shade of the garage I see three corrugated board boxes with a screened window in the top and duct tape to hold all together. Now that's a lifetime memory. The first time I see my very own bees. This is the instant of my beekeeping birth. Never mind that I know nearly nothing about what to do with them, but I've read a lot (I sound like a new parent).

I don't wish to appear antsy, but shouldn't someone be concerned about all this bee flight? Should I be protected? I feel nervous, not unlike a long-tailed cat in a room full of rocking chairs, but I refuse to let it show. Those are my bees and I will not leave without them.

A check will be fine

Money changes hands in the form of a personal check – $195 even. I have one final rational thought, "I am paying $195 for bugs – bugs!" but the thought quickly passes and I am again exuberant. The seller tells me he tried to do me right and put in more adult bees than I actually ordered. Then the first of several surprises – he tells me this is the first time he has ever sold splits. (Pregnant pause here.) So what does this mean – novice meets novice? I don't know. I guess it doesn't matter. I just assumed he had been doing this for years, but in fact, it is the difficulty and costs in ordering packages that encouraged him to consider selling splits. He is starting small but hopes to sell more in future seasons.

Second surprise

With propolis-stained hands he deposits my folded my check in his shirt pocket, and casually says, *"You'll need to release those queens in about three to four days."* Now what? I thought the queen and the bees were introduced and functioning as a unit. What do I know about releasing queens? My hesitation shows. The provider explains that all the bees and brood in the splits are not from the same hives and that released queens would be attacked. Even if I had gotten the mother queen from the colony, she would have needed to be caged for the transition. *(Oh? I didn't know that.)*

The move and unload

Finally, I take possession. The paper boxes are pleasantly heavy and bees are struggling at the screened windows. I'm as careful as I would be if the boxes were full of poisonous snakes. In the trunk all three go and I partially close and secure the trunk lid as planned. If I have questions or problems, I'm to give him a call. The queens are from good producers and should not be a problem, but he promises help if I have problems. Only after the bees are free-flying and the queens laying will the deal be really concluded.

The ride to my yard is uneventful. I have a good place near the back of my property where I keep my firewood. Since splitting wood is hard work, few people ever go back there. My bees should be happy. I'm in a cool climate here in Ohio so I have them sitting in the sun for the most part. In other climates, like Alabama, I would want the bees in the shade.

With my car parked nearby, I unload the clumsy boxes. These units are clearly good for very short term beehive use, but the short term is all I want them for and they

kept my price a bit lower. It would have been possible to take my equipment to my producer and have him put the splits directly into my deeps, but would have required more trips to his house (and he had a faint concern about disease spread – but I'm only using new equipment.)

My second memory

I sit the splits on cement half blocks temporarily. I don't know why, but I didn't want to sit them directly the ground. It really should not have mattered. It's late Spring and clover bloom is nearing. Then, my second life-long memory – *my bees in my very own beeyard.* I am now truly a keeper of bees.

I have the colonies sitting about ten feet apart *(I read that in several books).* I put on my veil and gloves (*in retrospect, I really don't need to do this*), and light a smoker *(which is also unnecessary).*

Time to release them. I really wouldn't mind some competent help right about now, but that's not to be. It's like testing your own electric circuit for the first time – someone must do it. I gently pull the tape screen back and bees boil out – not aggressively, but eagerly. The air begins to fill with bees and I briefly wonder if I what I am becoming involved in is something bigger than I had planned. *(Stay focused and open the other two.)* When the other two are opened, it's a biological wonderment. Bees are filling the air all around the hives. It's a good thing I am more than 10 miles from my producer. While some of the bees may drift from one split to another, at least none will drift back to the original hive.

Then there's the late afternoon hum

The buzz is pleasant and soothing. How can that be? These are stinging insects flying all about and I am finding solace in the moment. It's late. I'm tiring and dinnertime is near. Rest assured, my family will want to hear ***all*** about my adventures today and I will give them every tiring detail and I will do this for years to come. This is to become a way of life for me.

Now what!

I sit bolt-upright in bed awakening from deep sleep. ***Is that rain?*** My new bee colonies are sitting outside in paper hives and it's pouring rain. Should I bring them in? Cover them? What can be done at this hour of the night? Though I am asking myself all these questions, I know the answer, *"There is nothing I can do."* So I just lightly doze the remainder of the night. *(Fine beekeeper I am. Drowning my first colonies.)*

They're soggy

The boxes are soggy, and are clearly wet, but they are holding together. There is pretty good flight, but the bees are still very new to this location and to their individual split. *(Maybe I should wait at least one more day before putting them in permanent equipment.)* In fact, I wait two more days without incident. Even then, the paper boxes, though tired, are still holding together.

The transfer

It has now been three days. The queens are still confined. Actually, I probably could have opened the units and punctured the candy plugs in the queen cages with a small nail on the second day, but I am trying to err on the side of caution.

I put the permanent equipment on hive stands I have built, suit up, and light my smoker. These are small hives. They aren't going to do anything to me, but I need more confidence. I put the four wood frames right in the middle of the new equipment and fill the surrounding space with new plastic frames. The frames and comb containing bees and brood that I got from the seller look pretty good to me. I am thinking that my provider did me a favor with these three units. *(I wonder how the wood and plastic frames are going to get along? I'll worry about that later.)* The queens are alive in all cages. They have workers in the cages with them and I have been told to remove them, but I really don't have the nerve to try that. *(I'm just going to punch the small hole in the candy plug.)* Using thumb tacks and wire ties, I suspend the queen cage between the frames having brood on them. Though not the best feeder to use, I put a Boardman feeder on each colony with a quart of sugar syrup. Because of the feeder, I put in a modified entrance reducer in to restrict drifting and close all the units up. The hum is still in the air.

Queen progress

Three days later, I check to find all three queen cages empty, but I don't take the time to look for individual queens. Her future is still uncertain in the colony. This is an insecure time for me, the beekeeper. Do I have a queen in the colony or not? Again, I wait and wait.

A long six days later, with minimal smoke, I open the hives. I simply can't stand it any longer. I have a look and ***Yes!*** there are eggs and young larvae in all three units. All look good to me, the novice, but the split on the right is smaller and will need some assistance from its sibling colonies at some point. That will require some more reading on my part. Plus, though it is a bit late in the spring and these are small colonies, there is a chance I will need a second deep. I will need to watch that. As I told you earlier, I have already assembled the extra deeps.

But for now

But for now, I have bought my first splits, moved these splits, transferred them to permanent equipment, fed them, and released the queens in each of them. I'm satisfied with my part. Now a lot is up to them. I am a new beekeeper who has accepted responsibility for three new colonies. This is just the first chapter in my bee life. I sense there will be many more chapters to come. BC

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Aristotle On Honey Bees

An Ancient Overview

Dana Stahlman

What did early English beekeepers know about honey bees? It is evident from what I have been able to find on the subject that prior to Charles Butler's famous treatise on bees, general beekeeping knowledge was based upon ancient lore handed down from generation to generation. But with the introduction of ancient text due to the development of the printing press – two sources stand out and are often quoted by British authors of this early time period. Available to the English reader were English translations of one of the most classic poems of antiquity by Virgil called the *Georgics* and Aristotle's *History of Animals* translated into Latin by Schneider. I used Aristotle's text here, that was translated into English by Richard Cresswell of St. John's College, Oxford, England.

Aristotle was Greek and lived during the time of Alexander the Great. He had been selected by Philip, King of Macedon, to educate his son Alexander. Thus Aristotle maintained a very close relationship with Alexander the Great and was in position to study much of what existed in Alexander's Greek empire. We can be thankful today that Aristotle recorded much about natural history in his writings.

Aristotle's *History of Animals* is divided into 10 books. Generally they are about the animal kingdom and describe various animals, parts of animals, generative systems, and other useful information observed and studied. It is still worthwhile reading not for exact modern science regarding animals but for the link to the ancient world and the concept of life as Aristotle and his peers saw it. In that world, Man was the perfect animal. Man had reason, the ability to speak (communicate) and think. The fourth book discusses animals without blood and in the Fifth book, Chapter XVIII, he makes a number of remarkable observations about bees. So what is in this book that the beekeeper of the middle ages used for their authority on bees?

On Queens/King Bee

Their size is double that of the worker bees. By some they are called the mother bee, as if they were the parents of the rest; and they argue, that unless the ruler is present, drones only are produced and no bees. Others affirm that they have sexual intercourse, and that the drones are males, and the bees females. *Book V; 18, 19*

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The other bees originate in the cells of the comb, but the rulers are produced in the lower part of the comb, six or seven of them separated, opposite to the rest of the progeny. The bees have a sting, which the drones have not: the kings and rulers have a sting which they do not make use of, and some persons suppose that they have none.

The king bees never leave the hives, either for food or any other purpose, except with the whole swarm; and they say that, if a swarm wanders to a distance, they will retrace their steps and return until they find the king by his peculiar scent. They say also that, when the king is unable to fly, he is carried by the swarm; and if he perishes, the whole swarm dies with him. *Book IX; 27*

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There are two types of kings, the better sort of which is red, and the other sort is black and variegated, and in size double that of a good bee. The best kind is small, round, and variegated; the other is long, like the wild bee.

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On Drones

Some persons say that the drones build cells for themselves, dividing both the hive and the wax with the bees; but they make no honey, but both themselves and their young are supported by that of the bees. The drones generally remain in the hives; and if they fly out they rise in the air with a great noise, wheeling about as if they were exercising; and when they have done this they return to the hive and feast themselves on the honey.

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As long as the king bee is alive, they say that the drones are produced in a separate place; but when he is dead they are produced by the bees in their own cells, and such drones are more passionate; for this cause they are called stingers, not that they have any sting, but that they would sting, if they had the power to do so. The drone cells are larger. Sometimes they are placed by themselves, but are generally combined with those of bees, for which reason they cut them off.

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The drone is another sort: it is the largest of them all, has no sting, and is stupid.

It is good for the bees to have a few drones among them, for it makes them more industrious. *Book IX; 28*

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On worker bees

The small bees are more industrious than the large ones, so that their wings become worn at the edges, and their colour black and burnt, but the bright and shiny bees are idle, like women.

On rulers

There are two kinds of rulers among bees, as I observed before. In every hive there are several rulers, and not a single one, for the hive perishes if there are not rulers enough; if there are too many rulers they perish, for thus they become distracted. *Book V; 19*

On workers flight

When the wind is high, they carry a stone with them for a balance. *Book IX; 28*

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All the bees emit their excrements either on the wing, as it has been said before or into a single cell.

On Progeny

When it is damp, their progeny multiplies; for which reason, the olives and the swarms of bees multiply at the same time. They begin by making comb, in which they place the progeny, which is deposited with their mouths, as those say who affirm that they collect it from external sources. Afterwards they gather the honey which is to be their food, during the summer and the autumn; that which is gathered in the autumn is the best. *Book V; 18*

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After the progeny is deposited in the cells, they incubate like birds. In the wax cells the little worm is placed at the side; afterwards it rises of itself to be fed. The progeny both of the bees and drones from which the little worms are produced, is white.

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The progeny of the king-bees is not a worm, but comes forth a perfect bee...

They only build cells for the drones when there is plenty of honey. *Book IX; 27*

On Wax

Wax is made from flowers. *Book V; 19*

The bees collect the wax by climbing actively on the flowers with their fore feet. They cleanse these upon the middle pair of legs, and their middle legs again on the curved part of their hind legs, and thus loaded, they fly away. During each flight the bee does not settle upon flowers of different kind, but as it were from violet to violet, and touches no other species till it returns to the hive. *Book IX; 27*

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On honey comb

Honey comb is pressed when the wild figs begin to appear; and they produce the best grubs when they can produce honey.

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They commence the formation of their combs from the top of the hives, and carry them down until several reach the floor of the hive. The cells, whether for the honey or the grubs, are constructed with two mouths, for there are two cells built on each base, like a double cup, one on the inside, the other on the outside.

On Pollen and Propolis

They have another kind of food, which is called cerinthus (bee bread) which is of inferior quality, and sweet like figs. They carry this upon their legs as they do the wax. *Book IX; 27*

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For when a clean hive is given them, they build their combs, bringing the drops from flowers and trees, such as the willow, the elm, and other glutinous trees. With this they smear the floor of their hive, for fear of other creatures. The honey dealers calls this substance commisis, and they build up the entrance of their hive if it is too wide.

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They spread the substance called mitys at the entrance of their hives, near the opening. This material is black, as if it was the purification of the wax, and of a harsh smell. It is considered a remedy for contusions and suppurations.

On Honey

Bees do not make honey, but simply collect that which falls (honey falls from the air, principally about the rising of the stars and when the rainbow rests upon the earth); for those who keep bees find the cells filled with honey in the course of one or two days. *Book VII; 9*

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Honey becomes thick by ripening for at first it is like water, and continues liquid for some days, wherefore it never becomes thick if it is taken away during that time. It requires 20 days to make it consistent; this is very plain from the taste of it, for it differs both in sweetness and solidity.

There are two seasons for making honey, the spring and autumn. That formed in the spring is sweeter, whiter, and, on the whole, better than that formed in autumn. The best honey is made from the new wax and young flowers. *Book IX; 28*

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The gold-coloured honey is also good. The white honey is not formed of pure thyme, but is good for the eyes, and for wounds. Weak honey always floats on the surface, and ought to be separated. The pure honey is beneath.

On length of Life

The bee will live for six years, some have lived for seven, and if a swarm lasts nine to ten years, it is considered to have done well. *Book VII; 9*

On stings

When they have stung anything they perish, for they cannot withdraw their sting from the wound without tearing their own entrails;

but they are frequently saved, if the person stung will take care to press the sting from the wound; but when its sting is lost, the bee must perish. They will kill even large animals with their stings, and a horse has been known to perish, if attacked by bees. The rulers are the least cruel and stinging. *Book IX; 28*

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On Swarming

It is a sign that the swarm is strong when there is much noise and movement, as they leave and return to the hive, for they are then busy with the grubs.

Swarms are most abundant when the olives are fertile. *Book V; 18*

Insects generally thrive when the years is of the same kind as the season in which they were born, such as the spring, moist and warm. *Book VII; 26*

When the dealers in honey take the combs, they leave the bees some food for the winter. If sufficient is left, the swarm is preserved; but if not, they either die in the winter, or, if the weather continues fine, desert the hive. *Book IX; 28*

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The bees only cease from their work for 40 days during the winter solstice.

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Bees discern the approach of cold weather and of rain; this is plain, for they will not leave the hive, but even if the day is fine are occupied in the hive. By this the bee keepers know that they expect severe weather.

There is another disease, which is like a wildness in the bees, and causes a strong smell in the hives. The bees should be fed on thyme, the white sort is better than the red. They suffer the most when they work with materials affected with the rust.

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Wasps are very injurious to them, and so is the bird called titmouse, and the swallow, and merops. The frogs also in marshes destroy them when they come for water, for which reason bee-fanciers destroy the frogs in those marshes where the bees come for water.

On Work

They all have their proper work to perform. Some bring flowers, others water, and others polish and erect the cells. Water is brought when they are rearing their young. When the day is fine they work without ceasing, and as soon as the young bees are three days old, they set to work, if properly fed. *Book IX; 26*

On Taking Honey from Bees

When they are fumigated and suffering from the effects of the smoke, they devour the honey greedily, which they are not observed to do at other times. *Book IX 27*

Conclusion

Aristotle observed and wrote about bees but he was no beekeeper. It is certain that he knew beekeepers and honey sellers, observed the work of bees and read about them. Often he repeats, "Others say; or other persons affirm; or, and not all people agreed". This indicates that much of his material was gathered from others and he is reporting the various points of view then held.

This translation also differs somewhat from written statements in other research reports on Aristotle. Eva Crane's fine book, *The World History of Beekeeping and Honey Hunting* refers to Book IX (9) as having been written by a Pseudo-Aristotle.

I am not a scholar of early Greek Literature, but I found the *History of Animals* to be an interesting book. Aristotle wrote much in these 10 books about other animals – domestic as well as wild.

I was somewhat disappointed in not finding anything about the hives used or the hives being described. Should you be interested, Eva Crane's book covers the subject quite well and indicates the hives were most likely horizontal pottery hives. They must have been so common that Aristotle did not bother to describe the home of the bees but rather concentrated on the bees themselves. He does touch on swarming but does not discuss the beekeeping practice of putting them into hives or how to prevent swarming. Thus, I assume that swarming was an expected event.

It was common belief that the hive was lead by a King Bee. This concept was held for 1700 years until Butler set us straight. Although I found it interesting in the text of this material that some thought the leader to be a female and the drones male, this was not the prevailing belief. It is rather hard for us to accept that individuals thought that the young bees were gathered from flowers. Yet, some English writers of the 1600s still held the belief that bees collected the stuff that made young bees (Moses Rusden). BC

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Honey Plants

Connie Krochmal

USDA ARS photo

Melaleuca

Good intentions don't always lead to good results. That's certainly the case with invasive species. Many of these were originally introduced to the U.S. as either garden or soil conservation plants. Originally from Australia and New Guinea, the melaleuca (*Melaleuca quinquenervia)* is a notorious example of a good plant gone bad. Also known as punk, and cajeput tree, this tree yields nectar and pollen. Unfortunately, it has taken over vast areas of south Florida.

Since 1989, the state of Florida has spent over $3 million annually to control melaleuca. This invasive plant has caused an estimated $168 million of environmental losses in the state. Listed as a noxious weed by both Florida and federal agencies, it is illegal to grow, sell, possess, or move this plant into the area.

Growing Conditions and Range

Related to eucalyptus, melaleuca prefers a warm climate, and is suited to USDA zones 9b-11. Found as far north as Gainesville, Florida, it also grows in California, and the Caribbean.

Melaleuca withstands adverse growing conditions, including poor salty soil, and salt spray in coastal areas. Enduring flooding, it tolerates a range of soil types.

This tree has escaped and become naturalized in various habitats in Florida. Among these are hardwood bottomlands, cypress forests, low wet areas, marshes, moist open places, swamps, and wet pine flatwoods. However, it also grows in upland habitats as well, including abandoned farmland, pastures, prairies, and rangelands.

Melaleuca does best in full sun, but will tolerate partial shade.

Description

Though these erect, brittle trees can reach 80 to 100 feet in height, they're usually about 50 to 70 feet. The trunks eventually grow to four feet in diameter. Melaleuca is noted for its richly layered creamy white, papery bark, which is why the plant is often called the paperbark tree. It has a soft, spongy texture. Peeling away in thin layers reveals the reddish inner bark.

Often multi-trunked, melaleucas are many-branched with an oval canopy. Their branches are often pendulous.

These trees have aromatic, evergreen foliage, gray green to light green. Tapered at both ends, the leaves are four inches or so in length and an inch wide. These appear alternately or spirally on the stems. They feel leathery and stiff. Hairy when young, the foliage has parallel veins.

Clusters of small, round seed capsules surround the stems. Containing 200-300 or so extremely tiny seeds the size of pepper grains, they're hard and woody. These split when mature. Any kind of environmental stress or injury, such as fire, prompts the capsules to release the seeds.

Melaleuca has a fast growth rate of three to six feet per year. Due to their shallow root systems, these plants are fragile.

Flowers

Generally creamy white, the fragrant blossoms are arranged in close, cylindrical spikes on the branchlets. Encircling the stems, these flower clusters are two to four inches in length. Each individual bloom has five petals and five calyx lobes. The long stamens give the clusters a bottlebrush-like appearance – the reason the plant is also known as the bottlebrush tree.

Melaleuca blooms for about six weeks at a time. Although flowering can occur five or so times during the year, blossoms typically open from about March through September.

Value as a bee plant

In addition to being a source of pollen, melaleuca is an excellent honey plant, especially when other nectar sources are in short supply. It can yield a considerable surplus, most of which is produced in August. Beekeepers can get a 10-frame super per colony per week. The crop is recommended for building good strong colonies.

Originally it was disliked because of its characteristic flavor and aroma. However, beekeepers have discovered a good niche market for this specialty honey in the baking industry. This is also used medicinally. Con-

sidered unsuitable as a table honey, it normally wouldn't be used in blends.

The honey is generally strong flavored, but in some instances it is milder. Usually, the objectionable taste and fragrance will disappear when the product is stored, heated, or stirred.

The color ranges from amber to dark. It granulates rapidly.

Melaleuca as an invasive plant

Introduced around 1900, melaleuca was planted in California and southern Florida as an ornamental. The trees were grown as hedges, yard trees, and street trees. Along canals, lakes, and levees, they were used to stabilize soils. Landowners planted melaleuca to dry up swampy marshes and other wetlands. In the 1930s, airplanes were used to scatter seeds over the Everglades.

Melaleuca is now found in 19 counties in south and southwestern Florida. At one point, it had overtaken nearly half a million acres in the Everglades and other natural areas in the state. During the 1990s, experts estimated there were about six billion melaleuca trees in the Everglades.

These aren't as fast growing as the mile-a-minute weed. However, they continue to expand into new territory at a rate of around 15 acres per day. A single acre can contain 73,000 to 132,000 saplings or trees.

One key to melaleuca's success lies in its seedy nature. A mature tree can produce an estimated hundred million seeds each year. Distributed around the plant, these give rise to large numbers of saplings. All it takes is a few melaleuca plants in a location dropping seeds, and eventually you can have an entire forest of trees and saplings forming impenetrable thickets, crowding out the native species. The roots of the individual trees become intertwined and grafted together.

Other problems posed by melaleuca

This invasive plant poses a serious fire hazard for Florida residents. When one catches fire, it burns at a high temperature. The oil-rich leaves are highly flammable. During a fire the tops of the trees explode into flame, and easily spread to nearby areas. Melaleuca fires are hard to control.

This tree is the source of severe allergies. Sensitive individuals can experience respiratory distress and even skin rashes.

Since 1999, the plants have posed a new threat. Now they harbor a serious plant pest called the lobate lac scale. These spread from melaleuca trees to neighboring plants. This insect attacks over two hundred different plant species that are commonly grown in Florida.

TAME and attempts to control melaleuca

During the 1980s, Florida recognized that melaleuca posed problems, and began addressing the issue at the local level through the various water management agencies. In 1990, the South Florida Water Management District and the Florida Exotic Pest Plant Council established the Melaleuca Management Plan. They succeeded in removing the trees from 100,000 acres of public land.

In 2001, TAME came into being. This acronym stands for The Area-Wide Management and Evaluation Project of melaleuca. It's a collaboration of USDA's Agricultural Research Service, the South Florida Water Management District, and the University of Florida.

The goal of TAME is to demonstrate long-term measures for managing the plant in the most economical, sustainable ways possible. Promoting these controls among public and private land managers, TAME will focus specifically on biological control as the most environmentally friendly method.

By 2009, the South Florida Water Management District expects that melaleuca trees growing on public lands in the Everglades and the Lake Okeechobee area will be under control. Nonetheless, those growing on private property could continue to spread and colonize new areas if they aren't removed. For that reason, the project will establish demonstration sites showing private landowners how to manage the trees.

Clusters of small, round capsules containing 200-300 seeds each, surround the stems.
USDA ARS photo

Control measures

Not all means of control are suitable for melaleuca. For example, bulldozing stands of trees actually stimulates new growth, while burning them creates favorable conditions for the seeds to germinate.

For long-term control, the best approach is to remove single or scattered trees, thus limiting their invasion of new territory. In that respect, removing entire tracts or forests isn't as effective in halting the spread of the plant.

A combination of various control measures is recommended. Public agencies in Florida have been using chemical, physical, and biological control since the 1990s.

Control is on-going. It doesn't stop with the removal of existing trees. If left alone, new seedlings could re-establish in the affected region.

Herbicides work very well. For large areas, aerial spraying is used to apply the chemicals. When present in manageable numbers, the individual trees are girdled and treated with herbicide.

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The melaleuca is sometimes referred to as the 'paper bark' tree. This photo shows why. USDA ARS photo

Tree removal is another option. Once they're down, the stumps are sprayed with herbicide to prevent re-growth. When these are growing among native trees in natural areas, tree removal crews use a special machine known as the Brontosaurus. This mechanical wonder grinds the tree down to the ground beginning at the top of the plant. Then, the wood chips are spread on the area. Biological control by insects and herbicides can destroy any seedlings that emerge from the mulch.

Some companies make a tidy profit by selling the mulch to garden centers and nurseries. This is composted for 90 days to kill the seeds.

Biological control has worked very well thus far. Considered to be the best long-term method of control, this involves releasing insects that feed on melaleuca. Once scientists identify natural enemies of the tree in its native homeland, these are brought to the U.S. for testing. This on-going research has been taking place for about 16 years. Because the five distinct races of melaleuca in Florida differ in their chemical composition, the insects must be tested on each one.

Two insects have been successfully released as biological controls – the melaleuca leaf weevil and the melaleuca psyllid. Now, they're well-established in some parts of south Florida.

The melaleuca leaf weevil has done very well since its release. Initially introduced in 1997, this insect has become established in certain habitats. It is present in twelve counties where it reduces seed production by 80%. However, its use is restricted to dry areas, or during the dry seasons.

Following its release in 2002, the melaleuca psyllid is now found in some locations. It is appropriate for all habitats. These insects usually eat on the new growth. They do most of their damage from the fall through the spring months. In tests, they reduced flowering by 80%. No flowers – no seeds. These feed on saplings, and sometimes kill small seedlings. The psyllids stunt the plants' vegetative growth, and accelerate the aging of mature leaves. The psyllid spreads at a slower rate than the melaleuca leaf weevil, so scientists are planning additional releases in new areas.

Several other insects may be ready for release in the near future. In preliminary tests, a sawfly did very well. It destroyed every leaf in a ten-foot tree every three or four days. The melaleuca bud gall fly is another good candidate. By attacking flowers and leaf buds, it diminishes the overall vigor of the trees. In addition to these, scientists are also studying three others as potential biological controls.

How beekeepers could be impacted by these control measures

When will Florida beekeepers be impacted by these attempts to control melaleuca plants? Nobody knows for sure. If these projects receive the government funds they need in the coming years, they may succeed in eventually removing the trees from most public lands. In that case, beekeepers with colonies in these areas would be affected. On the other hand, these plans may become victims of budget cuts before their goals are accomplished. Continued funding to eliminate the seedlings as they appear would be needed as well. Otherwise, Florida will be stuck with a new generation of melaleuca trees.

The future of the plants on private land is another matter. Many will doubtless remain available to honey bees. It seems unlikely that thousands upon thousands of Florida landowners will rush to remove the trees at their own expense. The government needs to offer these people incentives, such as tax credits or direct payments. With budget deficits at record levels, that probably won't happen. BC

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

Sometimes It's The Little Things

James E. Tew

Most things in our bee world are heavy. Temporary wheels are always helpful.

Though I would like to think that every piece I write is better than the one before, I am aware that – try as I might – some are better than others. While a discussion of honey house hand trucks and carts might seem mundane, such devices are numerous in design and structure and absolutely invaluable in use. But this equipment is the unloved, the unexciting, and the unnoticed – until something needs loading. These devices are not pretty but are banged up, abused, overloaded and then ignored. But you can't get along without them. Every bee operation can justify either a cart or a hand truck or both, no matter how few the colonies. So, what's the big deal? A cart is a cart – right?

Most honey things are heavy

I have written about the equipment required to move hives and beehive equipment, and I have reviewed bad backs and human aches and strains that come with lifting and toting honey products. It seems that most things in our bee world are heavy. Temporary wheels are always helpful and that's where carts come in.

An important point

Before I even start my attempt to discuss the selection and use of hand trucks and carts, a characteristic that is immediately important to me is the weight of the hand truck or cart itself. Frequently, the carts themselves must be loaded. For instance, we would not be able to conduct our annual honey sale were it not our use of two ordinary platform trucks. But they, too, must be loaded and moved the 100 miles to the sale site. These two devices are the last thing to go on and the first things to come off. There's a cute little message on both of my platform trucks about "Not exceeding Capacities." Yeah, right! The height of the ceiling in the room is commonly the load limit of the cart, but that's just the beekeeper in me – overload and stress everything.

So my point, the cart or hand truck should be as heavy-duty as possible but still be loadable itself. Just as much as the buying price and the wheels, consider the weight of the cart or hand truck when making your decision.

Some of our cart workhorses in the lab.

Hand Trucks

Even if no beehives are in sight, most households could justify a hand truck. A look at Lowe's Home Improvement Centers or at McMaster-Carr Supply Company lists literally a hundred or so different variations and weight ranges for hand trucks. Composition ranges all the way from plastic to aircraft-grade aluminum. Obviously, prices vary greatly, too.

Handles

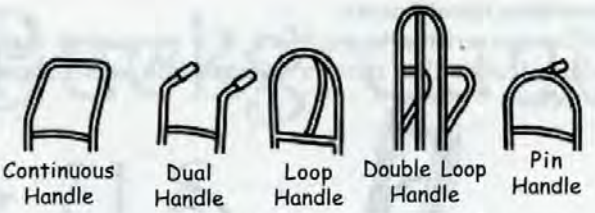
The common hand truck comes with the possibility of several different handle styles. At my lab, we have hand trucks with all the styles except the loop hand shown in the figure.

J. Tew pick - If given my choices, I prefer some variation of the continuous handle while I like the pin hand the least. All the others are somewhere in between.

Wheels

The common choices are hard rubber on a plastic rim, ball-bearing hard rubber or pneumatic tires. The cheaper, lighter hand trucks will have the hard rubber on a plastic rim with no bearing as such. Ball-bearings make life much easier, but will add to the cost of the truck.

A classic aluminum hand truck.



Common styles of hand truck handles.

J. Tew pick – I like the ball-bearing hard rubber wheels best. Hand trucks having small pneumatic tires are a close second, but under an abusive load, the pneumatic tires allow the load to sway gently.

Also, as the tires bulge under a heavy load, the effort I must extend increases. Plus, several times per year, air must be added to pneumatic tires. Just one more thing I will have to put on my "to-do" list. Plastic wheels are not the worst thing in the world, but are not as heavy duty as the other two types of wheels. I suppose I could say that plastic wheels are much better than no wheels at all.

Frames

Generally, hand truck frames are made from composition plastic, steel tubing or some variation of aluminum or other space-age metals. A few wood frame models are still available, but these units are uncommon now except as antiques. Composition plastic frames are the cheapest and they are lightweight, but the frame will flex under load. Up to now, nothing bad has happened to me when using the lighter hand trucks but they are clearly much more unhappy under a 200 pound load than a comparable metal hand truck. Steel tubing is a common frame for a hand truck but aluminum is lighter and just as strong. Magnesium frames are lighter and even stronger (and even more expensive).

J. Tew pick – I like aluminum frames, though steel will do. But I really like Magnesium framed hand trucks[1]. The frame is as lightweight as it can be and yet still readily bears the weight of a load of honey. The cheaper plastic frames are really marginal.

The Walter T. Kelley Company advertises a hand truck called *Kelley's Nose Truck*. Its features are: 10" x 3½" pneumatic tubeless tires on ball bearing wheels on a steel frame. Additional height can be added by installing ¾" pipe and dual wheels are available. Though I have not seen this unit, it sounds like a heavy-duty hand truck.

My idea of the perfect honey house hand truck

My perfect hand truck has a continuous handle on an aluminum frame and cast aluminum nose plate (but I really like the Magnesium ones better and they don't cost that much more.) riding on hard rubber tires with ball-bearings.

In this discussion, I am primarily using this hand truck to move equipment and honey containers indoors on a hard floor. While this truck could be used to move hives outdoors, the narrow wheels will bog quickly.

Honey House Carts (Platform trucks)

Talk about diversity! McMaster-Carr[2] alone lists more than thirty styles of carts – all in nearly innumerable sizes and heights. While any cart (Platform truck) can be made to work, I have grown accustomed to features that a couple of our lab carts have.

Cart weight

As discussed above, the actual weight of the cart is important to me. The cart should be heavily constructed, but still be as lightweight as possible. It needs to be heavy-duty because it is going to suffer abuse.

Low to the ground

While this will require some stooping to load and unload, a low cart is more stable when loaded and can be loaded with more product than a cart riding higher.

Deck

I like a smooth deck on the platform truck that is about 30" x 48". To give more surface area, we added wood decks to our metal carts. Though honey cases occasionally slip off, I don't want any ridges or grooves to hold the honey cases or containers in place.

Wheels

Ideally, the wheels are ball-bearing, hard-rubber and about four to six inches in diameter. These wheels can withstand a lot of weight without swaying. Plus, the hard rubber withstands heavy use on rough cement surfaces without undue wear. Plastic wheels are quickly shredded when loaded and rolled across rough cement. In my opinion, it is important that only the two wheels nearest the handle swivel while the remaining two wheels are fixed. On one of my carts, all wheels swivel making the cart hard to steer when loaded.

[1]Having said that I like Magnesium frames, I once broke a small part on a Magnesium-frame hand truck and have yet to find someone who can weld it back. Apparently, Magnesium just bubbles when common efforts are made to weld it.

[2] McMaster-Carr web address: http://www.mcmaster.com/

Continued on Next Page

Convertible Hand Trucks

The convertible hand truck is a version of cart/platform trucks that tries to be both with some degree of success.

Closed up, the convertible hand truck looks like the common hand truck, but opened up, the device looks more like a platform truck.

While I like these gadgets okay, they should be well made and be up to the test. Try as I might, I don't care for the useless wheels hanging from underneath the uprights, but there is no changing that. So overall, this design does an "okay" job of being both a hand truck and a platform truck.

So what's the best?

The number and models of hand trucks and platform trucks are astounding – and I didn't even discuss drum trucks. In this case, one size does not fit all. The best hand truck for the honey house may be a very poor hand truck in the field when moving colonies and no platform truck works well in the field. As usual, you'll have to decide – equipment that does a so-so job of everything or several units designed to perform specific jobs. Regardless, you should know that these workhorse devices will be overloaded, abused, dropped from the back of the truck and then tossed back onto the truck – and all the while expected to perform quietly without fail. That's a tough life. Thank heaven these guys can't complain. 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/

Georgetown University Medical School.

Thirty years ago Charlie supplied bee venom to Col. James Vick, a cardiovascular pharmacologist working at the Walter Reed Army Institute of Research. Col. Vick was studying the effects of snake venoms when he became interested in the effects of bee venom, particularly for arthritis. The pure bee venom supplied by Charlie made it possible to perform controlled studies – injecting exact amounts of venom in an exact site in a reproducible manner. The studies were done on aged, arthritic beagles that exhibited the same type of osteoarthritis as humans. Each beagle was fitted with a pedometer that measured activity both before and after bee venom treatment. The beagles responded to the therapy thus demonstrating most conclusively that bee venom does have a therapeutic effect. Jim Vick's studies were successfully repeated in a small animal veterinary clinic in Baton Rouge.

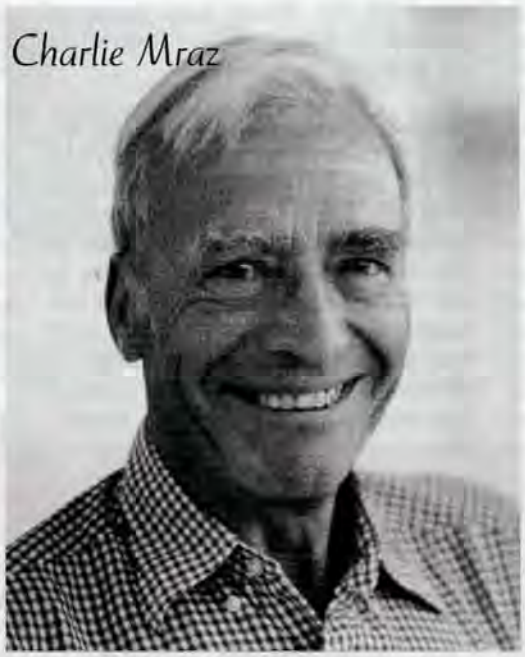
Bee venom was also supplied to Jurgen von Bredow and Ann Harman whose studies involved treating arthritic horses. Sport horses develop osteoarthritis from the activity of galloping and jumping on hard ground. Bee venom was effective in some horses, but not all, and did not demonstrate the same effectiveness observed in the dogs. Charles Mraz was delighted that someone could use the venom on which he had spent years to develop collection and purification techniques.

When Charlie died in 1999 his family worked to create a memorial to him. In July 2004, the hand-chiseled marble bench was installed in a park in the center of Middlebury, Vermont. The bench, hexagonal in shape to resemble a honeycomb cell, is joined by an American linden (basswood) tree, planted nearby. The inscription on the bench reads:

In Memoriam/Charles Mraz/
1905–1999/Beekeeper/
Apitherapist/Humanitarian.

An engraving of a honey bee will be added to the memorial. Two other tributes to Charles Mraz exist. One is the annual Charles Mraz Apitherapy Conference (CMAC) and the other is a scholarship fund to support low-income people who would like to attend the annual conference.

Although Charlie's initial interest was in the treatment of arthritis with bee venom, over the course of his life he received requests for treatment of other conditions. Towards the end of his long life he began bee venom treatment of those afflicted with Multiple Sclerosis (MS). Thus he was behind the success of a woman with MS from Waldorf, MD – Pat Wagner. She was told by her doctor that she had been given all the available drugs to alleviate MS and there was nothing more that could be done for her. Pat decided that bee stings would be her next treatment. Much to the surprise of Pat and her family the bee venom reversed her symptoms. Today Pat is in demand – for treatments and as a speaker who, herself, is testimony to the beneficial effects of apitherapy through bee venom.


Charlie Mraz

Two products, honey and venom, seem to be quite universal in their use. The other products are more regional. Royal jelly is favored by Asians but finds only minor use in the United States. Propolis is popular in parts of Europe and has a limited following in the U.S. Pollen is universal but its use in the United States is limited. During the presidency of Ronald Regan, who used pollen every day, pollen as a dietary supplement was very popular. However, its use gradually declined after Regan left office. Beeswax has had limited use around the world. But the bee herself, primarily as brood, is a nourishing food, especially in countries where protein is in short supply. In Asia the markets feature honeycomb with brood along with pollen and honey. Insect larvae have not been considered part of America's diet.

A vast amount of literature exists around the world giving anecdotal accounts of the benefits of the various products of the hive. Results of true clinical research are a bit difficult to find. Two classic books have been reprinted and are also occasionally available as originals on the second-hand market.

One book, *Bee Venom Therapy*, by Dr. Bodog Beck is frequently quoted. Dr. Beck used the live bee for his patients. The book with 238 pages and a bibliography was originally printed in 1935. Dr. Joseph Broadman's book, *Bee Venom: The Natural Curative for Arthritis and Rheumatism* is available in a 1997 reprint. Dr. Broadman used injectable bee venom in his treatments. This book also has a bibliography.

For enjoyable reading Fred Malone's book, *Bees Don't Get Arthritis*, is a tale of his travels across the United States meeting with people who were using bee venom as well as those treating with bee venom. Charles Mraz was encouraged to write about his work with bee venom. His book, *Health and the Honeybee*, was published in 1994. Charlie spoke of his life with bee venom and why and how he used bee stings. The most recent book on honey and its therapeutic value was written by Joe Traynor. His *Honey – The Gourmet Medicine* is delightful reading and very informative. Michael Simics of Apitronic Services in Canada, has written numerous publications on venom collection and its uses.

Next month we will see the various apitherapy services available today and what the future might bring. At the moment the honey bee

and her hive products seem to be having a renewal of interest. It is interesting to note that researchers cover the globe looking at therapeutic possibilities of various plants and animals. Unfortunately many species are disappearing with the encroachment of civilization. Fortunately the honey bee is not in danger of extinction, even with all the problems of pests and parasites. Perhaps we can count on her to give us even more useful products than we have today.

Ann Harman contributes each month on many diverse topics, from her home in Flint Hill, VA. BC

? DO YOU KNOW ?

Pollination

Clarence **Collison**
Mississippi State University

Planning and preparations for the upcoming season, unfortunately for procrastinators, are important components in managing your beekeeping operation. Supplies and equipment need to be purchased and normal equipment maintenance needs to occur. If you are in a situation where you are able to participate in providing colonies for early season pollination, then planning and preparations become even more critical. Pollination contracts are an excellent way to build additional financial security into a beekeeping operation. Pollination has long been recognized as the most important contribution the beekeeping industry makes to agriculture. Having colonies in excellent condition for pollination as well as early season nectar flows requires intense management early in the Spring.

Level I Beekeeping

1. Three species of bees often associated with blueberry blossoms are ___honey bees, ___carpenter bees and ___bumble bees. Rank them in regards to pollinator efficiency. 1= best pollinator, 3= poorest pollinator. (3 points).
2. ___ Honey bees are excellent pollinators of male sterile onions. (True or False)
3. ___ Cranberries are largely self-compatible but insect visitation is required to extract pollen from the anthers and transfer it to receptive stigmas. (True or False)
4. ___ Growers commonly rent honey bee colonies for cranberry pollination and colonies do well while they are at the cranberry bogs. (True or False)
5. ___ Pear flowers produce abundant pollen which is highly attractive to honey bees. (True or False)

In almond pollination, the flower's ovules become 6. _____ and the ovary becomes a 7. _____ .

8. ___ In order to have a uniformly shaped watermelon, pollen needs to be uniformly distributed over the three stigmatic lobes. (True or False)
9. ___ Muskmelon vines have both male (staminate) and female (pistillate) flowers. (True or False)
10. ___ In general, citrus is considered as a crop with little or no need for insect pollination. (True or False)
11. ___ Pollination of all of the pistils of a strawberry flower is necessary for maximum berry size. (True or False)

Advanced Beekeeping

12. ___ Pear flowers are protogynous; anthers mature and release pollen before the stigma is receptive. (True or False)
13. ___ Both blueberries and cranberries have porose anthers. (True or False)
14. ___ After an alfalfa flower is tripped, the sexual column returns to the keel petal of the flower. (True or False)
15. ___ An almond flower is self-incompatible. (True or False)
16. ___ Almond flowers have two ovules and it is desirable to have both of them fertilized. (True or False)
17. ___ Eggplant pollination is achieved by wind or vibration of the blossom, as it is in tomato. (True or False)
18. ___ Soybean flowers, like alfalfa, must be tripped in order to achieve pollination. (True or False)
19. ___ An open sunflower head is composed of sterile ray flowers, florets in the pistillate stage, florets in the staminate stage and developing florets in the bud stage. (True or False)
20. ___ Honey bees are effective in the pollination of figs. (True or False)

Please match the following terms that describe the plant/pollination mechanism. (4 points)

A. Ornithophilous B. Entomophilous C. Mellitophilous D. Anemophilous

21. ___ Pollinated by bees.
22. ___ Wind loving, or plants whose pollen is carried by wind.
23. ___ Bird loving, or bird pollinated.
24. ___ Insect loving, or insect pollinated.

ANSWERS ON PAGE

?Do You Know? Answers

1. 1= bumble bees, 2= honey bees, 3= carpenter bees
2. **False** Honey bees are less than ideal pollinators of male-sterile onions that are used in the production of hybrid seed. Pollen-collecting bees confine much of their activity to the pollen producing rows without adequately visiting and cross-pollinating the male sterile rows. Only nectar collectors move freely from pollen-sterile to pollen-fertile plants, making the necessary transfer of pollen from male parent to female parent.
3. **True** Cranberries are largely self-compatible but insect visitation is required to extract pollen from the porose anthers and transfer it to receptive stigmas. The five to eight individual brownish stamens fit so closely together they form a tube. As the anthers in the stamen mature, they release the dry pollen which falls out the tip of this tube. The pollen is relatively heavy and is not wind blown, nor is it likely to come in contact with its own stigma.
4. **False** Cranberry growers commonly rent honey bee colonies for pollination services. Beekeepers, however, generally report that colonies fare poorly when place on cranberry bogs, possibly due to the cranberry flowers not providing adequate nectar and pollen supplies.
5. **True** Pear flowers produce abundant pollen which is highly attractive to bees but the nectar is low in sugar content and frequently fails to attract bees. Thus, achieving adequate pollination can sometimes be difficult.
6. Edible kernel, meat of the nut
7. Thin, leathery inedible hull (mesocarp)
8. **True** Pistillate (female) watermelon flowers have a three lobed stigma. In order to get a uniform shaped watermelon, the bees need to uniformly distribute 1,000 to 1,500 pollen grains over those three stigmatic lobes.
9. **False** Unlike most cucurbits that have both staminate (male) and pistillate (female) flowers, the muskmelons have staminate and hermaphroditic (bisexual) flowers. Even though they have bisexual flowers, bees are still needed to transport the sticky pollen from the staminate to the hermaphroditic flowers to produce a commercial crop of melons.
10. **True** In general, citrus has been considered as a crop with little or no need for insect pollination. Most citrus do not need pollination as they are self-pollinating, or they produce fruit parthenocarpically. Most species and varieties of citrus are attractive to bees and colonies on citrus produce delicious honey in commercial quantities.
11. **True** The strawberry flower receptacle is covered with individual pistils. Pollination of all of the pistils of a flower is necessary for maximum berry size. If all pistils are fertilized, a perfectly shaped berry should develop. If only a few are fertilized, an irregularly shaped berry or "nubbin," sometimes only 1/5 the size of well fertilized berries will develop.
12. **False** The pear flower is protogynous which means that the stigma of an individual flower is receptive to pollen before its anthers release pollen, not that anthers mature and release pollen prior to the stigma becoming receptive.
13. **True** In both blueberries and cranberries, five to 10 stamens are inserted at the base of the corolla, around a much longer style that is receptive only on its tip. Pollen is released through pores on the end of the anther during the period of stigma receptivity. Bees most commonly harvest the concealed pollen of porose anthers by shivering their flight muscles while gripping a flower. Their audible buzzes vibrate the anthers, shaking a cloud of loose, dry pollen out of the anthers and onto the ventral side of the bee.
14. **False** In alfalfa, the corolla consists of the standard petal, sometimes considered to be the landing support for bees, two smaller wing petals, and two fused petals called the keel. The keel encloses, under considerable tension, the sexual column which terminates in the stigma and 10 anthers. The sexual column is normally nonfunctional, unless it is released from the keel. Once released ("tripped"), it does not return to its former position within the keel like the column in most other legumes.
15. **True** The almond flower is self-incompatible. A pollen tube of a flower of the same tree, the same variety and sometimes of certain other varieties will not grow down the style. Therefore, cross-varietal pollination is required between two or more varieties with compatible pollen.
16. **False** The almond flower has a single pistil with two ovules. One or both of the ovules may develop into fruits; however a "double" is not desired in commercial production. A single nut-meat is desired.
17. **False** Wind is not a factor in eggplant pollination, and vibration of the blossom will not cause a sufficient deposit of pollen on the stigma. The eggplant does not self-pollinate without the aid of bees or man. The anthers form a cone-like tube around the style and they dehisce at the terminal pores in a manner similar to that of the tomato flower which favors self-pollination. However, the eggplant stigma ultimately projects beyond the anthers, where pollinating insects are more likely to contact it.
18. **False** The soybean floret has the characteristics and shape of many other legume flowers – a large standard petal, two small wing petals and a keel petal that encloses the staminal column. The soybean is considered to be self-fertile and not benefited by insect pollination. The anthers dehisce before the flower opens so that the stigma is in contact with and receptive to the pollen on the anthers. Pollination and fertilization is usually accomplished before the flower opens.

Continued on page 58

GLEANINGS

FEBRUARY, 2005 • ALL THE NEWS THAT FITS

WINFRED HONEY PLANT EXPLODES

Officials said they will try to determine what caused an explosion that destroyed one of A.H. Meyer and Sons' buildings in Winfred, a village a few miles west of Madison, SD.

Fire departments from Winfred, Howard, Ramona and Madison responded about 8 a.m. to the blast at the honey plant.

No one was in the building. Company vice president Jack Meyer Jr. said he had been in it 20 minutes earlier before going across the street to the office.

"I looked outside, and the whole thing was leveled," he said. "I feel the good Lord had his arms around me."

Reports from the scene said the force of the explosion blew a garage door into some nearby trees. Three of the four walls collapsed, and debris was scattered around the site.

Shelley Beck, who lives three blocks from the building, said the noise from the explosion shook her house.

One substance that was used in the building is heptane, which is similar to paint thinner, Johnson said. A large amount of heptane was stored in a tank on the west side of the building, and Johnson said firefighters were worried about keeping it from exploding as well.

The building had been rebuilt after a fire about 14 years ago. Two years ago, fire destroyed Meyer's beeswax rendering plant about a block south of Friday's explosion. – *from AP*

EU IMPORT PROBLEMS

More than 60 Hungarian beekeepers demonstrated in downtown Brussels against the European Union's honey policy after finding they were unable to sell 70% of their 2004 production.

The volume they did sell earned prices down 45% on the previous year.

"Honey producers in the EU conform to strict rules regulating the production of honey," Bross told The Budapest Sun. "This is not true of the Asian and South American producers."

The image of Hungarian honey is being lowered by the cheap quality of the mixed honey, he said.

The association wants EU regulations changed so that the cheaper quality honey would be classified as second or third grade. It also wants mandatory country of origin information on all labels and a ban on the mixing of honey from different countries.

– *Alan Harman*

GOTCHA!

A Canadian company has been convicted on charges of selling honey with sugar added.

Yvan Joyal, director of 9073-3189 Quebec Inc, was convicted on six counts of breaching the Food and Drug Act by selling barrels of honey in a false or misleading manner regarding the character and composition of the product.

A government statement said the honey in question exhibited an atypical sugar profile, namely the presence of sugar originating from sugarcane/corn.

Justice Andre Cartier of the Court of Quebec fined Yvan Joyal and his company C$3,600 at the Thetford Mines court house.

– *Alan Harman*

GROWING HEMP

Representatives of the Hemp Industry exhibited at the American Farm Bureau Federation's (AFBF) annual convention at the Charlotte Convention Center to educate farmers about the need to change federal laws that prevent them from growing industrial hemp. Vote Hemp (booth #614), a non-profit advocacy organization, gave away hemp food and displayed a wide variety of hemp products, such as automobile parts and paper, sold in the U.S. but made with imported industrial hemp.

"The U.S. government treats hemp the same as marijuana even though dozens of countries including Canada, England and Germany understand the difference. American farmers know that hemp isn't a drug. What we will show them is that there is a global market for industrial hemp that they are unfairly locked out of," says Eric Steenstra, president of Vote Hemp. "The American Farm Bureau Annual Convention is the perfect place for Vote Hemp to jumpstart our legislative and education efforts by networking with farmers from across the country who want to grow industrial hemp."

"More and more health foods containing omega-3 rich hemp nut and oil are appearing on store shelves since the legal status is no longer an issue," says Alexis Baden-Mayer, Director of Government Affairs for Vote Hemp. "Right now the U.S. marketplace is supplied with hemp seed grown and processed in Canada and Europe. We are working to convince Congress it is time for the U.S. to allow American farmers to grow industrial hemp so they can participate in this lucrative growth market."

INTERNSHIP AT THE PFEIFFER CENTER

Internship is intended for students in agriculture and environmental sciences and related fields who want to broadenand deepen their understanding of organic sustainable agriculture and the biodynamic approach. Some gardening experience and familiarity with biodynamics is helpful but not necessary. The main qualification is a willingness to work and openness to new ideas.

Qualified interns are provided with a dormitory room in Holder House, a 40-room student dormitory on the campus of Sunbridge College. No stipend is provided. Some part-time work is available on campus to qualified students. A limited number of Summer Internships are available under different conditions.

For information or for an application, call 845.352.5020, ext. 20 or intern@pfieffercenter.org.

ILLINOIS BEEKEEPER OF THE YEAR

At the Illinois State Beekeepers Association Fall meeting Marlin Wagner was chosen as Beekeeper of the Year and was presented with a plaque of recognition as well as a lifetime membership to the IL State Beekeepers Association.

19. **True** The head of a sunflower is composed of ray florets with the showy yellow petals which are sterile, having neither stamens or pistils. The less conspicuous florets making up most of the head are hermaphrodite, but protandrous (flower in which anthers mature and release pollen before stigma is receptive), and many are self-incompatible. The florets are normally open two or more days. The first day, the anthers release their pollen in the anther tube, which is partly exserted from the corolla. The pollen is collected freely by bees, along with the nectar at the flower base. The second day, the stigma pushes up through any pollen mass remaining, then its two lobes open outward, receptive to pollen but out of reach of its own pollen.
20. **False** The figs grown commercially are basically of three types. The common type develops its fruit parthenocarpically. The Smyrna type must be pollinated with pollen from the inedible caprifig. The San Pedro type produces its first crop of the season parthenocarpically, but its second crop develops only if its flowers are pollinated. Smyrna and the second crop of San Pedro figs are pollinated exclusively by the hymenopterous fig wasp *Blastophaga psenes* (L.) which overwinters in the caprifig fruit. The use of this wasp is the oldest form of man-manipultated insect pollination, a system referred to as caprification.
21. C) Mellitophilous
22. D) Anemophilous
23. A) Ornithophilous
24. B) Entomophilous

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 6 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.

POLLEN PROBLEMS IN AUSTRALIA

Australian researchers have found a way to control Disappearing Disorder – also called "muck" – after previous research failed to find a cause of the disease.

The disorder is fundamentally a problem of bee brood, although it also affects adult bees.

In some years outbreaks can be quite severe resulting in serious losses of brood and bees, although in other years outbreaks are mild.

The disorder appears almost annually during spring and early summer in bee colonies in northeast New South Wales and eastern Queensland, areas where some commercial queen production is carried out.

Researcher Denis Anderson said his studies in the first two years of the project were directed at checking honey and pollen samples collected from affected colonies for their element content and with testing affected larvae for microbial pathogens. Studies in the third year were directed at finding a cure for the disorder.

In the first year of the project mild outbreaks of disappearing disorder were reported from two localities near Cunningham's Gap and Gympie in Queensland. Beekeepers indicated that the mildness of the disorder was due to recent heavy rains.

In the second year of the project colonies were again examined at the same two localities. The disorder was more severe at the Cunningham's Gap site than in the previous year. In both years the symptoms were noted, brood samples collected for testing for microbial pathogens and pollen and honey samples collected for testing for their element content.

The symptoms observed in colonies affected with the disorder at the Cunningham's Gap site were similar to those reported from previous outbreaks at the site. However, the symptoms observed in colonies said to be affected with disappearing disorder at the Gympie site differed from those at the Cunningham's Gap site in that the affected brood were mostly very young larvae and these were being quickly removed from their cells by nurse bees.

In both years no evidence was obtained that the disorder was caused by a microbial pathogen. There was also no unequivocal evidence that any of the mineral elements tested for caused the disorder.

In the final year of the project a severe outbreak of disappearing disorder was examined near Gladstone in Queensland. Tests were conducted to determine if the disorder could be controlled.

Pollen traps were fitted to affected hives at two sites to block incoming pollen. The colonies in these hives were then fed commercial pollen patties placed under their lids to compensate for the loss of incoming pollen and sugar syrup to dilute incoming nectar. Other hived colonies at both sites were left untreated as controls.

Prior to fitting the pollen traps, the levels of brood spottiness was estimated and the numbers of larvae affected with disappearing disorder were counted in both the treated and untreated colonies. These estimates and counts were repeated three days after the pollen traps were fitted.

At both sites the numbers of larvae showing clinical signs of disappearing disorder dropped significantly in the colonies fitted with pollen traps and fed dietary supplements compared to untreated colonies.

"This result clearly indicates that the cause of disappearing disorder is associated with bee forage (pollen or nectar) entering colonies and demonstrates a simple method by which the disorder may be controlled," Anderson said in his report.

– *Alan Harman*

INTERNATIONAL CONTEST

The Environment and Culture Council of The Excellency of Azuqueca de Henares City Government, through the Municipal Apiculture School, announces the following apiculture photography contest with the following rules, as published on our website. See all about the contest and winners in the other editions at www.aulaapicolazuqueca.com/.

Agustin Arias Martinez, Coordinator, Aula Apicola Municipal, Concejalia del Medio Ambiente, Azuqueca de Henares-Guadalajara, España, aulaapicola@jet.es.

OBITUARIES

Worcester County Beekeepers in Massachusetts lost one of its members in July – **Bob Beauvais**. Bobby was a mentor to many over the years and a very active member. He had been honored as Beekeeper of the Year, was active in annual bee school, served on the board of directors and directed the Spencer Fair Honey Show each year.

Gracie Lee Annis Swords, 82, of Moultrie, GA died October 12.

Mrs. Swords was born in Colquitt County to the late Walter Cue Annis and the late Lou Annie Hays Annis.

She married the late Vernon Monroe Swords and she is survived by their five children – Monroe "Sonny" and wife, Cindy of Moultrie; Walter "Wally" and wife, Veronika of For Pierce, FL; Gracie DeLucas and husband Paul of Selma, AL; Sandra "Sandy" Suber and husband Gene of Moultrie; and Deborah "Debbie" Joyner and husband John of Harlem.

Mrs. Swords became fascinated with the honey bee industry during her high school years. She was instrumental in forming Swords Apiaries with husband Vernon. her main interest was raising prized hybrid queens that were sold and shipped to many states and countries.

Check Out Page 6
Be A Part of The
2006 Calendar.

PERIODICALS

RURAL HERITAGE – bi-monthly magazine in support of farming and logging with horses, mules, and oxen. Subscription includes THE EVENER Workhorse, Mule & Oxen Directory; $28 for 6 issues; sample $8.00. Rural Heritage, 281-B Dean Ridge Lane, Gainesboro, TN 38562. 931.268.0655, www.ruralheritage.com

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BOTTOM ... Cont. From Pg. 64

work at his den. Dejected, I strolled back to the house. The bees had won. Another year had come and gone and the hives stood unpainted, gloating in the moon glow. The bees were undefeated – Four-Zip.

The next morning I took a walk out to the hive. There in the early morning sunlight I found the brush casually placed on top of the hive, dried and stuck like glue to the hive cover. No! The hive cover! The only part that still looked somewhat decent on the entire hive now had a large paint stain, and now with a brush stuck to it. I tugged, and after three attempts dislodged the brush. Well, most of it. Large sections of the bristles still remained stuck to the top with the large saucer size shape of paint on the cover. Well, the bees had defiantly won. I admitted defeat. Even today I can still look outside to the backyard at that particular hive cover. The cover with paint and paintbrush bristles still stuck on it remains as a gentle and somber reminder of the importance of keeping up with repairs and monthly duties when it comes to beekeeping. Next year I promise to paint early, paint often.

Display Advertisers

Another year has passed; the trees were bald and leafless in the early Winter morn. I had just finished checking the bee catalog for the umpteenth time. When a thought struck me. Paint those hives. Each year I consult my yearlong planner provided by our local bee club on the monthly duties and chores each beekeeper should do to maintain his beekeeping operation. I've found that in the cold Winter months repairing and painting the hives is an excellent way to pass the time before the hectic Springtime schedule is upon us. However painting in 30-40°F weather is not recommended (says so on the back of the can of paint).

What to do? What to do? I know, I will postpone for just a few days; perhaps it will get warmer. Well! You know what happened. January turned into February, into March and soon it was the middle of April. Bees were a buzzing and my faithful wife reminded me for the tenth time that the hives looked a bit shabby. Matter of fact they looked down right miserable. The hives, five in all, were all spread out over the backyard and looked great from inside the house. But upon closer inspection they looked reminiscent of an old beat up outhouse or discarded piles of lumber you might see along the side of the road. The paint had faded, the edges looked torn and jagged from hive tool wear and the hive bottoms were unpainted platforms of bare wood. The only decent part was the spotless tops of shinny metal hive covers.

With grim determination and a foreboding sense of up coming disaster I attempted the nearly impossible. Paint the hives *prior* to the first warm day of Spring, but Spring sprung early this year and the bees were buzzing about looking for pollen and the first nectar. I looked up the weather report – mid 50s, sunny, no breeze. Perfect weather for painting! With brush and cans in hand I approached the hives.

"Buzz!" went the anxious bees. They stared with cautious eyes from their porches as I approached. As I stirred the paint in the can I noticed a few bees inspecting the cans of white paint, curious bees soon turned into accident-prone bees and before I could slap the first coat on six bees had dive bombed into the can of paint. Suicide? Or just incompetent fliers? Who know? Now the word was out. Paint man was attacking the hive with his deadly brush! The bees were out in force, so much activity that I was forced to retreat. Bees one; Painter zero.

Protection was needed and soon the veil came out to protect me as I made the second assault upon the dilapidated hive exteriors. As I approached the fortress an alarm went out and soon the bees, sensing a change on their exterior walls decided to fly around me, the paint brush, and the outside of the hive. The sun beat down, mid 50s? Balderdash! It was 100° at least as I tried to paint the first hive. Bees climbed on the brush, the can, and the hive surface fresh with paint. Soon bees with little painted feet walked up and down the veil cover. It was too much! The sun, the dripping paint, the sloppy paint job was too much. I retreated to the coolness of the garage, exhausted. Bees two; Painter zero.

What I needed was a fresh tactic; perhaps smoke would encourage them to leave me alone long enough to get at least one coat on the first hive. As I fired up the smoker an uneasy feeling swept over me. A warning came to me from the back of my mind. Smoke equals fire. The can of paint warned of exposure to fire or flammable substance while painting. The smoker idea faded almost as quickly as the sun did that Spring day. Bees three; Painter zero.

As I entered the house my wife asked, "Done already?"

"No!" I exclaimed as I pulled off the veil and sat down with a huff upon the kitchen chair.

"Well you certainly got enough paint on your veil. Look at the paint all over the side of your hat," my wife advised.

I looked in disgust at the paint already drying on the veil screen of my hat. I must have touched it by accident as I made my feeble attempt at painting the hive. Yet the uneasy feeling of dread still hung over me. I shook it off to a bad experience and went about cleaning my beekeepers veil. Later, around midnight, as I lay in bed that night I woke up with a start. The brush! I forgot to clean the brush.

"What," said my sleepy wife as I climbed out of bed to get dressed.

"The brush. The brush, I forgot to bring in the brush." I shouted.

"What brush?" she asked rubbing the sleep from her eyes.

"The paintbrush. I think I left it at the hive when I was painting this afternoon." I grunted as I hopped on one foot as I tried to slip on the other boot.

"Oh that brush, don't worry it will still be there in the morning" and with that she turned over to go back to sleep.

I rushed outside still pulling on my jacket to ward off the cool evening chill. The hive stood out in the moonlight. A dull, paint-chipped box of off color white. The hive that gave me so much grief that day stood motionless in the early morning mist. The brush was nowhere to be seen. It was gone! Possum? Hardly, unless one was an interior decorator on the side and was using the brush to touch up some paint

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Ricahrd Flanagan

Painting. Bees - 4, Painter - 0

BOTTOM BOARD