Bee Culture

JULY 2005
BeeCulture.com

Trapping pollen is a good idea, and every beekeeper should have a trap or two in place. Charles Simon explains how to trap pollen, with the trap on top, instead of the bottom of a hive. Check out how to make that happen on page 44. Photo by Ray Sherrod, submitted by Charles Simon.

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

JULY 2005 VOLUME 133 NUMBER 7

FEATURES

DEPARTMENTS & COLUMNS

Allergic Reactions

I am a longtime reader and admirer of this publication and this letter is a comment on a recent article.

While reading the article Sting Stopper which briefly discussed generalized reaction, as opposed to the local reactions, to bee sting, I realized that this was only part of the story. The article, not intended to be definitive, gave as its treatment the use of epipen or anapen. These are means of self-administering the drug Epinephrine which will reverse the symptoms of the allergic reaction, briefly. Neither instrument will have any lasting effect on the allergy to bee venom, but is an excellent emergency treatment.

Bee stings produce either local or generalized reactions.

The local reaction is the redness and swelling at the site of the sting and is only a minor annoyance which soon abates, with or without treatment.

The generalized reaction is defined by symptoms which occur at a point distant to the site of the sting. These symptoms may vary from a generalized rash with or without generalized itching, swelling, difficulty with respiration and/or circulatory collapse. This can, and often does, develop into a life-threatening situation and many people die as a result each year It is postulated that many of the unexplained, acute and sudden deaths are due to this type of allergic reaction. It is a fact that these fatalities from reactions to bee stings exceed deaths from snake bites, or any other envenomation each year

Clearly this is not a situation to be taken lightly.

About 10 years ago, I was working with some bees that I have at a vacation home. It was misting rain and the bees were irritated because they couldn't work. When I began checking them, they didn't like it, but I felt that I had to check them that day as we were leaving the following day. The upshot was that I was stung about seven or eight times.

Within five or six minutes, I noted a tingling and itching sensation in my scalp. I recognized that I was having a generalized allergic reaction. Fortunately, I had some epinephrine in my bag and gave myself several injections of it as each time the symptoms abated only to return.

When I returned home I consulted an allergist, locally, as I didn't want to be under a cloud of potential disaster and, besides, I would have to give up beekeeping. The local allergist skin tested me, determined that indeed I was allergic to bee venom and referred my case to an allergist at The Medical University of SC. This allergist referred my case to a personal friend and an allergist at Johns Hopkins University. From there this allergist referred me to an allergist, also at Johns Hopkins, who specialized in bee sting reactions in beekeepers.

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Up to this time, all we had had to desensitize patients who were allergic to bee stings was "whole bee extract" which used a vaccine made from the whole bee. The percentage of venom in this vaccine was very low and it was not very effective. Only recently had pure bee venom become available.

This last allergist called me and explained that I was to receive a series of injections of bee venom from the local allergist and after two weeks, I would no longer be sensitive to bee venom. To maintain that state I would have to receive monthly injections for five years.

Things have worked out exactly as he said they would. I continued to work with my bees and have had only the usual local effects with bee stings.

I am writing this as I am sure that there are other beekeepers that are not comfortable with carrying an Epipen and waiting for "lightning" to strike with the next bee sting.

I am not sure that the average primary care physician is aware of this treatment modality that is available and simply prescribes the Epipen.

Michael C. Watson, M.D.
Bamberg, SC

Sting Stopper Error?

I would like to challenge a statistic in the article Sting Stopper, by Karen Kirsch. She states that "every year more than 1,000 Americans die from stings and bites each year " That would average more than 20 deaths per state. While searching for data on bee stings on the internet, I found the National Safety Council website, nsc.org. Under statistics/what are the odds of dying, it states in 2001, 43 Americans died of "contact with hornets, wasps or bees." That averages less than one person per state. As a beekeeper I want to believe the National Safety Council data, but also to anyone who follows local news, the NSC data seems more likely

What was Karen Kirsch's source of data? Are the results of Sting Stopper equally exaggerated? At least it is a reasonably priced product. If I ever see any for sale anywhere I might try it, but I am skeptical of the claims.

Dewey Hassig
Minnetonka, MN

Editor's Note: *Yes, you have a good eye. There was inadvertantly added an extra '0' to the number. It should have been 100. We apologize for the error, and to the 900 or so people we*

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seem to have dispatched because of it. Rossman Apiaries is a distributor of this product if you decide to try it.

Loaded With Info

I received my first issue of *Bee Culture*. I am really impressed. Finally – a magazine loaded with helpful information. I was receiving the other magazine and found no need to be reading about beekeeping in a foreign land. I did not renew.

Now – I'm finding in your magazine a lot of good "American" information. I'm taking the time to read the articles since they are about "American beekeeping."

I read letters about all of the mite and foulbrood problems and the medications being used. We had our few hives inspected and found no problems and no need for medications.

I have seen honey bees in the walls of people's houses and out in the woods in hollow trees. Who is medicating these bees? They are there, every Spring! No problem with mites, no problem with diseases, no medication, no inspections, no starvation, no feeding. Why?

Another thing I've noticed, why would anyone send those photos to a magazine of the hives I've seen in articles? What a mess! Neglected looking, no paint, no show at all, just scroungy looking hives, look dilapidated, junky looking messes, filthy.

We take extreme care of our few hives to be sure they are in good condition, painted and well maintained. So you want to be free of problems – clean up!

George Harker
Killbuck, OH

Editor's Note: *Thanks for the kind words, but if you visit, please don't look too closely at my hives.*

More About Glue

I would like to thank those individuals who responded to my original letter to the editor regarding the gluing of frames. I viewed the letters as constructive criticism. Hopefully now we will all have a better and more balanced understanding to the problems of using glue in a high humidity environment, that of a beehive.

Russell Walker
Phenix, VA

Editor's Note: *I found the exchange on glue one of the most enlightening topics we've discussed in years. I too thank all of the contributors for educating us, especially Mr. Walker.*

Importing Bees?

Your inner cover commentary in the May issue is excellent. Hopefully a slap in the face for those numerous individuals in this industry who are so short-sighted (and deaf) as to not see the train just up the tracks, whistle blasting.

We in Canada have lots of experience with those poorly sighted people lobbying for 18 years to import packages, like old times. Actually it was availability issues to packages that initiated the concept of wintering bees in Canada once again during the 1970's. Some time later disease and mites came to be the issue to exclude bees from the South. Today those of us who have persisted have a strong self-sufficient industry built around colonies of bees that have adapted to our climate and in some cases tracheal mites. We have projects running here looking for bees tolerant of *Varroa* and will find those strains, given time. Time we have because, nearly two decades ago we, as an industry, decided to become self-sufficient, much to the chagrin of a few naysayers.

Currently, we still have both miticides that work against *Varroa* and genetic resistance to tracheal mites.

Do what you will but experience has taught the savvy among us to rely on thy neighbor sparingly, which is what you were saying in your commentary.

Terry Fehr
Meadowlark Honey Ltd.
Gladstone, Manitoba, Canada

More On Importing

In the May 2005 issue of *Bee Culture*, you advocate an "annual" approach to beekeeping: since we cannot effectively control mites, import packages each spring from pest and disease free sources overseas, harvest all the honey, and kill the bees at the end of the season. Have you checked into the price of packages recently? Before widespread *Varroa* resistance to Apistan, treating a hive cost less than $5 a year Packages are $70 from American suppliers including shipping. Will packages from Australia cost less? Have you considered that over most of the continent production from a healthy overwintered hive is much greater than from a hive started in May from a package? The reason beekeeping has traditionally taken the "perennial" approach is it is more cost effective and less work than what you propose. What we need are mite and disease resistant strains of bees that can be overwintered, or an evolving pipeline of effective mite and disease treatments to replace those to which resistance is developed over time.

Mike Onyon
Haverhill, MA

. . . And Still More

I just read your "Inner Cover" from *Bee Culture's* May 2005 issue, where you talk about the possibility to come back to the "old way" of killing the bees in Fall instead of overwintering them, starting next Spring with foreign packages.

I have to say that I don't agree with that way at all. True, this would put the mite and beetles issues to rest. True, it could be economically sound for big scale beekeepers and pollinators. But look deeper at what you suggest.

Those "bazillion packages in *Varroa*- and AFB-free places" would have to be produced there. The huge demand for packages would ask for new kinds of producers. Packages would have to be produced at the highest rate possible.

Bees would be selected to improve traits that meet that need for package production, but at

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INNER COVER

I don't know much about birds; brown, black, blue, big or small, they're all kind of the same to me. A few are familiar. The rest might as well all be sparrows – just bigger or louder or some other color.

Except Red Winged Blackbirds. Those I know pretty well. Growing up, I lived by a wetlands and nesting Reds were as common as cattails. I learned early on what each of their many calls meant. I knew when the males were being territorial, when I was too close to a nest for comfort, and when all was well in the Red Winged world.

I left the Reds and their wetlands behind after high school, but 20 years later, I got a dog that needed a daily walk on the wild side and the Reds, the dog and I got acquainted. It was old home week for me, but a whole new language for the pooch. As she (the pooch) tore through the undergrowth near the lake where we walked, she'd stir up those Reds in nesting mode, raising their ire, volume and attention. Pretty soon they'd be darting in and out, swooping down, diving close to both of us as we approached their low down nests. The pooch was mostly oblivious to this aerial display because her nose was to the ground, following those trails that only dogs can find.

Once, when she was about 10 yards in front of me, a particularly protective Red dove nearly straight down and hit that dog's rump with both feet, bounced up and took off. The dog yelped, did a mid-air 180 and gave me a really dirty "What'd you do that for" look. She never saw the Red, and was always just a bit suspicious after that.

Fast forward another 20 years. I'm nowhere near a wetland now, and the rare Red I see is usually just passing through. They seldom stay long enough to go through their musical repertoire.

So this past Spring I was surprised to hear a male territorial call and then to see some aerial acrobatics between competitors taking place over my backyard. A couple weeks later, in a tree right next to the deck, sat a pleased-as-you-can-be female, whistling away. A tree. This close to the house. Well, maybe they've changed.

Soon, those feisty days of yesteryear were back. She was dive bombing me every time I stepped outside. Screeching from a distance. Even hanging from a branch, upside down mind you, only six feet above me, yelling at me to "GET OUT NOW!", as loud, and as plain as could be.

We'd talk, that Red and I. Or yell. She'd yell, I'd talk. It got to be kind of comical, really. Every day she'd get closer; sitting on the railing or the table, all the time giving me what for Then she'd fly off, and dive bomb return. Or, which was fun to watch, she'd do this feet first bullet drop, right at my bald head, then pull up at the last minute. I could've hit her with a tennis racquet if I'd a mind. It was a game, but she always won because I always left, eventually.

Yesterday she was gone. The deck was safe again; all's quiet on the Red Winged front. I walked around the tree, out further even, looking and waiting to hear Nothing. Gone. Zip. Why? Where? My Audubon neighbor had a few thoughts. The barn cat got her Or the Chicks. Or another bird got the eggs. Maybe my persistent presence finally got to her and she split. Or disease or parasites won. Maybe the location was marginal and food was scarce. Who knows? Without evidence – feathers, egg shells, a body – there's no knowing. Nature 1, Birds 0.

Not unlike colonies you'll find this month. Gone. Empty. Zip. What happened? Without bee bodies, or mite bodies, without sticky boards, who knows? Like my feisty red winged friend, your bees will just be gone. Act

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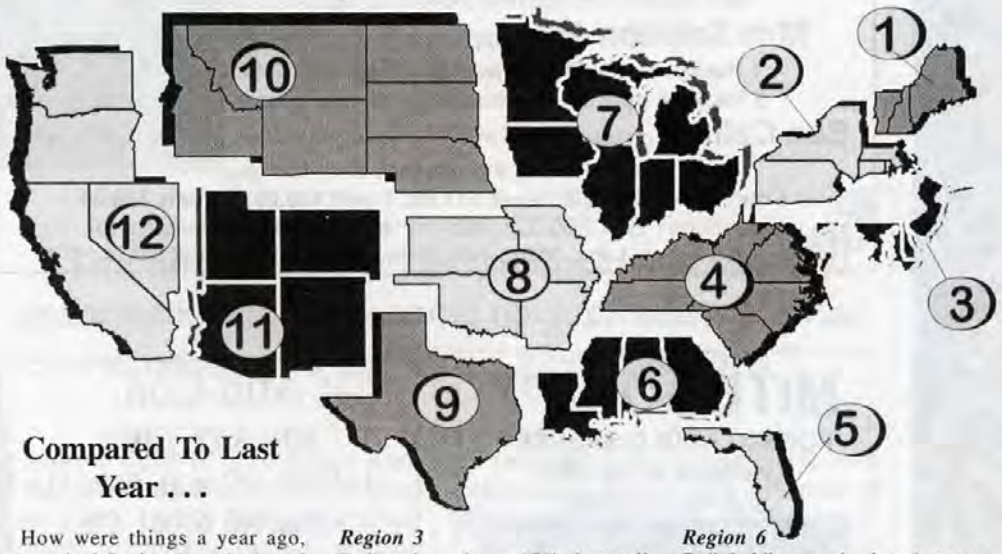
Missing Birds; Airmail Queens; 2006 Calendar, and July 4th

JULY – REGIONAL HONEY PRICE REPORT



Compared To Last Year . . .

How were things a year ago, price wise? Let's take a look and see what difference a year makes. So compared to last year.

Region 1
Bulk prices down 18%, pails down 10%. Wholesale prices up, but retail down. Beeswax up 37%.

Region 2
Bulk prices down 36%, but pails up 11%. Wholesale prices up a bit, but retail down some. Beeswax up 57%.

Region 3
Bulk prices down 17%, but pail prices essentially unchanged. Wholesale prices up, but retail prices mixed – some up, some down. Beeswax down 10%.

Region 4
Bulk prices down 12%, but pails up 5%. Both wholesale and retail prices way up, and beeswax up 14%.

Region 5
Bulk down 8%, but pails down 27%. Wholesale steady to up just a tad, and retail steady to lower. Beeswax down 64%.

Region 6
Bulk holding steady since last year, but pails down 7%. Wholesale steady to up a smidge, but retail definitely down. Beeswax down 12%.

Region 7
Bulk down 22%, and pails down 5%. Wholesale steady, but retail up a bit. Beeswax down 12%.

Region 8
Bulk down 16%, but pails holding steady. Wholesale up some but retail mixed and all over the map. Beeswax up 67%.

Region 9
Bulk prices down 30% and pails down 14%. Wholesale steady to up a bit, but retail only steady to down a tad. Beeswax unchanged.

Region 10
Bulk down 35%, but pails steady. Wholesale mixed with some up, some down. Retail steady to slipping, and beeswax steady.

Region 11
Bulk prices down 14%, but pails up a whopping 40%. Wholesale steady to up a bit, retail steady to down. Beeswax up 22%.

Region 12
Bulk down 12%, and pails down 20%. Wholesale mixed, and retail down. Beeswax up 28%.

	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	1.00	0.90	1.00	1.05	0.93	0.98	1.12	1.00	0.85	0.75	1.18	1.15	0.75-1.18	0.99	1.01	1.31
55 gal. Amber	0.96	0.75	0.96	1.00	0.86	0.95	1.00	0.96	0.82	0.96	1.30	0.85	0.75-1.30	0.95	0.89	1.14
60# Light (retail)	95.00	116.70	113.40	99.10	82.00	97.00	100.60	103.33	113.40	115.00	155.00	105.00	82.00-155.00	107.96	111.29	108.99
60# Amber (retail)	95.00	110.40	107.80	97.70	78.00	93.50	93.34	92.50	100.00	107.80	150.00	80.00	78.00-150.00	100.50	102.99	104.42
Wholesale - Case Lots																
1/2# 24's	38.78	50.38	40.65	37.35	40.65	32.00	38.71	40.65	40.65	40.65	30.00	41.36	30.00-50.38	39.32	41.55	36.06
1# 24's	55.71	62.28	65.91	55.59	59.19	56.00	60.41	62.40	53.10	65.91	74.90	69.27	53.10-74.90	61.72	61.10	60.90
2# 12's	59.08	61.72	57.85	51.93	58.20	48.00	55.89	69.00	48.33	57.85	27.00	59.09	27.00-69.00	54.50	55.02	58.20
12 oz. Plas. 24's	51.84	57.78	54.21	56.00	36.00	48.00	48.69	51.60	41.57	48.00	70.80	52.02	36.00-70.80	51.38	54.23	47.45
5# 6's	55.70	67.86	64.80	56.00	64.80	60.00	60.57	50.00	50.00	51.00	58.00	63.13	50.00-67.86	58.49	59.60	58.38
Quarts 12's	75.00	100.35	87.43	80.50	66.00	79.33	82.63	77.00	84.50	110.88	90.20	86.06	66.00-110.88	84.99	82.92	77.59
Pints 12's	53.00	49.95	56.77	53.75	42.00	55.00	55.40	48.00	45.88	49.50	51.50	51.38	42.00-56.77	51.01	49.68	47.31
Retail Honey Prices																
1/2#	2.10	2.41	2.50	2.83	1.99	2.99	2.69	1.79	2.39	2.63	2.59	2.55	1.79-2.99	2.45	2.44	2.80
12 oz. Plastic	2.75	2.97	3.50	3.22	3.41	3.25	3.08	3.39	3.34	3.27	3.43	3.41	2.75-3.50	3.25	3.15	3.31
1 lb. Glass	3.25	3.53	4.50	4.12	3.68	3.75	3.65	4.22	3.75	4.03	4.14	4.21	3.25-4.50	3.90	3.79	4.19
2 lb. Glass	6.17	6.46	8.00	5.99	6.24	6.99	6.07	7.87	5.93	5.79	5.74	6.88	5.74-8.00	6.51	6.44	6.24
Pint	4.00	6.88	6.64	5.62	6.47	5.17	6.21	5.75	4.90	6.43	5.90	5.18	4.00-6.88	5.76	5.53	5.61
Quart	8.00	8.55	8.07	8.04	7.77	7.65	8.34	8.76	8.40	10.18	8.11	10.03	7.65-10.18	8.49	9.20	9.36
5 lb. Glass	12.13	13.51	18.00	13.08	15.00	13.00	12.40	15.99	9.50	10.76	11.25	12.29	9.50-18.00	13.08	13.51	12.47
1# Cream	4.38	5.16	7.40	4.76	7.40	3.75	5.00	4.58	5.00	5.06	7.31	3.87	3.75-7.40	5.31	4.84	4.47
1# Comb	4.38	4.41	6.45	5.32	6.45	4.50	6.35	4.60	6.45	6.00	5.50	6.36	4.38-6.45	5.56	5.66	5.27
Ross Round	4.91	3.90	4.91	4.65	4.91	3.00	4.85	4.75	5.00	5.63	5.75	4.75	3.00-5.75	4.75	4.79	4.57
Wax (Light)	2.25	3.25	1.40	2.08	1.40	1.82	2.17	3.25	2.11	1.40	1.95	2.82	1.40-3.25	2.16	2.36	1.96
Wax (Dark)	1.92	2.82	1.30	1.84	1.15	1.72	1.17	3.00	2.00	1.61	1.50	1.25	1.15-3.00	1.77	1.89	1.91
Poll. Fee/Col.	46.00	39.75	35.00	51.00	65.00	42.50	43.75	50.00	30.00	58.61	75.00	41.67	30.00-75.00	48.19	47.28	38.60

Mark Winston

Irony

"The alleged impact of imidacloprid has an uncanny knack of popping up just when *Varroa* resistance to miticides first emerges."

I make a habit of periodically surfing the Canadian Honey Council web site (*www.honeycouncil.ca*), particularly the "News" section that comes up on their home page. It's chock full of beekeeping tidbits that include everything from serious issues through to quirky stories.

If you want a snapshot of what's going on in our industry at any given time, this is the place to look. A third of the top stories at the moment have to do with pesticides, pests, and diseases, both inside and external to the hive, while another group of stories focuses on honey.

Each story reveals a different subtext of what's happening within beekeeping, fascinating glimpses into the sometimes-dark, occasionally amusing, but always interesting world that bees and their keepers inhabit. These disparate stories are tied together by one common thread. irony arising from resistance by pests and diseases to pesticides or antibiotics.

The lead story at the moment happens to involve an attempt by Canadian beekeepers to get oxalic acid registered as a treatment for *Varroa*. The need for treatment has become more extreme due to *Varroa* that is resistant to pesticides registered in Canada, especially Apistan.

The story has an ironic level unmentioned in the press release and swept under the carpet in most public discussions about resistance: we got into this pickle in the first place by over-using miticides. Not surprisingly, issues of rampant abuse of pesticides by beekeepers, and residues in honey, are not part of the submissions for registration.

The news item focuses on the more superficial level of how to get a pesticide registered in what chemical companies consider a minor use industry. Canadian beekeepers decided on their own to submit all the documentation and pay the high registration costs, likely into hundreds of thousands of dollars plus 3% of future sales.

To date, beekeepers have donated $22,000 and industry $6000. As the news release points out, "*there are fees and costs involved in the preparation of further information for the Pest Management Regulatory Agency (PMRA). There are gaps in the Canadian research and other unforeseen expenses. We welcome any donations to this project.*"

This bit of fund-raising news is followed by the "good" news that the PMRA has approved the emergency use registration of CheckMite+™, a dinosaur compound that is being phased out from the pesticide arsenals for most other applications. CheckMite+™ (coumaphos), of course, is considered essential because fluvalinate (Apistan) no longer works in most of Canada and the United States against *Varroa*, and so CheckMite+™ is routinely approved for "emergency" use every year.

Whether self-induced or not, resistance to Apistan has put beekeepers into quite a pickle, since other anti-*Varroa* compounds such as formic acid still require the occasional treatment with CheckMite+™. The best we can do at this point is to use the milder but less effective miticide as often as possible, and the more nuclear pesticide only when absolutely necessary Still, resistance to CheckMite+™ is becoming an increasing problem, and the race is on to discover a better alternative before even that undesirable current treatment becomes ineffective.

While you might question whether annual use of CheckMite+™ equals an emergency, the Canadian Honey Council has convinced the PMRA to streamline applications from each province into one national application each year What I find most ironic about this situation is that both CheckMite+™ and Apistan are products of Bayer CropScience, a company currently demonized by beekeepers for

Another story, this one out of New Zealand but a repeat of stories that have emerged like clockwork from France, Canada, the United States, and now down under. That story, of course, is "Bee Deaths May Be Linked to Seed Treatments," and informs us that "*beekeepers are concerned that an insecticide, imidacloprid, used on squash and maize seed had caused the loss of around 200 beehives between last Autumn and Spring.*"

This beekeeping legend continues to make the rounds, country by country, so far without evidence. The alleged impact of imidacloprid has an uncanny knack of popping up just when *Varroa* resistance to miticides first emerges.

Varroa arrived on the north island of New Zealand just a few years ago, and resistance to Apistan should be popping up right about now. It would be an interesting coincidence, indeed, if testing should demonstrate that this was the year when the kiwis joined the rest of the *Varroa*-infested world in the beekeeper-induced resistance plague.

Another interesting coincidence is that similar unexplained colony deaths have not been reported from the south island, where imidacloprid also is being used but *Varroa* has not yet been reported. Hmm

But there is good news for down-under Australian beekeepers, and it comes from a story documenting North America's bad news: *In California's 550,000 acres of almond*

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"These stories are connected by the common theme of pest and disease resistance to treatments, and highlight a key message for beekeepers: if you'd like to reduce the amount of irony in your beekeeping, cut back on your own use of miticides and antibiotics."

orchards, the bee shortage is leading growers to offer beekeepers almost twice what they paid last year for their bees' services – up to $100 per hive. Growers have been riding a wave of good prices and strong demand, but they say the mite crisis is squeezing their profits.

Good news for U.S. beekeepers, you would think, this $100 per hive, except ironically the supply of colonies is so impoverished that almond growers had to import thousands of packages from Australia on an emergency basis to make up the shortfall.

Another press release on the pesticide front bodes well for beekeepers, but might not make almond growers happy: *The Minnesota Supreme Court ruled that honey bees which enter fields treated with pesticides are not trespassers, but foragers that are owed reasonable protection from harm by applicators and property owners. Observers say that allowing beekeepers to sue for damages to their hives sets a significant precedent for other such cases around the country.*

The story goes on to report that property owners now are liable for bees killed while foraging in farmers' fields that have been sprayed with pesticides toxic to bees. The story is heavy with legalese, but the bottom line is that a farmer who sprayed with the insecticide Sevin is being held liable for killing bees, even though the colonies were not on his land. Sevin is another old-fashioned compound that has fallen into disfavor among farmers partly because of its impact on bees, but more because pests have become resistant, again due to overuse.

Good news for beekeepers, I guess, but especially for lawyers, as it won't be long before every beekeeper with a dead-out will be picking up the phone before the fork lift. Pesticide kills often are tough to prove, but the $2 million in damages claimed in the Minnesota case will be a powerful incentive to try. And as to our almond grower friends, wouldn't it be ironic if beekeepers pulled an "imidacloprid," blaming and suing growers when colonies didn't do well when placed on almonds for pollination?

Is there any purely good news, stories with no ironic undertones? Ah, finally, a happy story popped up on the Honey Council web site: *Comvita ApiNate honey based wound dressings are now available in New Zealand. The dressings are the first medical product to be developed and launched in New Zealand by the NZAX listed company. The new dressings contain active Manuka honey which research has demonstrated is a more effective honey for assisting wound management because of its Unique Manuka Factor (UMF®).*

Manuka honey is well-known for being one of the few apitherapies backed by scientific evidence rather than folklore. Peter Molan, a research scientist from New Zealand, conducted exhaustive tests demonstrating its efficacy against certain types of bacteria-induced stomach ulcers, and that research has now been extended towards external wounds.

The dressing is proving particularly important for wounds that are resistant to antibiotics, so I guess even here we find some irony. The plague of antibiotic resistance is similar in medicine and beekeeping, with rampant resistance to terramycin resulting in outbreaks of American Foul Brood throughout the world, again due to overuse of that compound.

The same phenomenon among human patients has opened a new market for the manuka honey dressing, and perhaps other uses where antibiotic resistance is a medical issue. Whether there's a miracle manuka factor is hard to say, but honey does have antibacterial properties due to its low water content and presence of low levels of the antibacterial agent hydrogen peroxide, both factors for which tolerance by bacteria is less likely to develop than to pharmaceutical antibiotics.

These stories are connected by the common theme of pest and disease resistance to treatments, and highlight a key message for beekeepers: if you'd like to reduce the amount of irony in your beekeeping, cut back on your own use of miticides and antibiotics. BC

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RESEARCH REVIEWED

Explaining • Defining • Using

Steve Sheppard

". . . although the authors provide clear evidence for the occurence of the phenomenon that honey bees reared at low brood temperature have higher susceptibility to tracheal mite infestation, they point out that the mechanism to explain "why" it happens is still unknown . . ."

The honey bee tracheal mite, *Acarapis woodi*, is a parasite of adult honey bees that first came onto the beekeeping radar screen in 1919, when it was identified as the probable cause of the Isle of Wight disease. The malady was named for the widespread death of honey bees that occurred throughout the Isle of Wight in the early 1900s. By the 1920s the tracheal mite problem had spread to continental Europe and Isle of Wight disease became a leading cause of colony mortality. While no entirely satisfactory treatment was found to control the mite back in those days, within a few decades it was no longer considered to be a major problem. The reason(s) for this may be debatable, but the decline in European beekeeper interest in tracheal mites could have resulted from selective pressure brought about by the mites themselves. That is, mite-induced mortality may have eliminated highly susceptible honey bee populations, leading to eventual replacement with mite-tolerant honey bee populations. Indirect evidence for this possibility came from later studies by Brother Adam that found that honey bee colonies headed by queens imported from the United States were much more susceptible to tracheal mites, compared to local British stocks in the same apiary.

By the 1980s, tracheal mites were introduced to U.S. honey bee populations and, again, widespread colony losses were attributed to this parasite, especially in regions of the country where winters were severe. While increased mortality of infested colonies has been reported to occur in colder climates, the basis for this mortality has been somewhat speculative. However, two researchers from Trinity College in Ireland recently moved closer to solving this puzzle, when they demonstrated that bees reared at cooler temperatures exhibited increased susceptibility to tracheal mite infestation (McMullan and Brown, 2005).

The researchers based the experimental set up on the use of inoculation cages, whereby newly emerged experimental or "target" honey bees were introduced into cages of mite-infested "host" honey bees maintained in cages in an incubator. Two treatments were used to obtain target honey bees from each of three experimental hives. From each hive, one frame of sealed brood was maintained in the hive (at a normal hive temperature of 34°C) and a second frame was maintained in an incubator at 30°C. After nine days, the hive frames were moved to an incubator (34°C) and then emerging workers were collected from both treatments over the next 24 hours. These bees were marked with paint and then 30 marked bees from each treatment/hive group (180 bees total) were placed in each of two inoculation cages containing approximately 300 mite-infested worker bees. After seven days in the inoculation cage, the target bees and a subset of the host bees were removed and frozen for later analysis. Analysis consisted of painstakingly dissecting each sample bee under a microscope and counting the number of adult mites, larvae and eggs inside the prothoracic tracheae.

The results of the study indicated that the temperature difference in brood rearing had a significant effect on the number of mite-infested bees in a sample (mite prevalence). The summary of the treatments showed that 41% of the bees reared at 30°C were infested with mites, while only 20% of the bees reared at the more normal temperature of 34°C were infested. The authors also observed that female mites produced the same number of offspring in the honey bees reared in either the low or normal temperature. Thus, the two fold difference in susceptibility could be related to differences in the initial infestation of the bees by mites. The authors suggested that these find-

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ings "could help to explain aspects of the epidemiology of tracheal mite infestation in honey bees." Prior studies had shown that honey bee colonies with >30% of their workers infested with tracheal mites showed significantly increased Winter mortality and that the rate of Winter mortality from mites was higher in colonies maintained in colder climates. Research has also shown that honey bees infested with tracheal mites have reduced ability to generate heat from their thoracic muscles, due to impairment of airflow in the prothoracic tracheae. In concert with their finding that bees reared at lower temperatures have increased susceptibility to mite infestation, the authors concluded that these factors may be very important in reducing colony survival in Winter and went on to describe a scenario leading to a downward "spiral" in colony viability.

Based on the ratio of mite eggs/larvae found in the infested bees, the authors also suggested that the high infestation of bees reared at lower temperatures resulted from a "much higher susceptibility at emergence," rather than a longer period of susceptibility for newly emerged workers. Interestingly, although the authors provide clear evidence that honey bees reared at low brood temperature have higher susceptibility to tracheal mite infestation, they point out that the mechanism to explain "why" it happens is still unknown. Elucidation of the mechanism underlying variation in susceptibility found here could have obvious applications, if it could be manipulated within an apicultural setting. The next step relies on these authors or their colleagues to work further toward isolating such a mechanism and reporting it to the scientific and beekeeping community. BC

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THE DEATH OF TRESPASSING BEES: WHO IS TO BLAME?

Sylvia A. Ezenwa, J.D.

Lately, the beekeeping world has been all abuzz about the decision of the Minnesota Supreme Court in *Jeffrey Anderson, et al., v. State of Minnesota, Department of Natural Resources, et al.*, 693 N.W.2d 181 (Minn. 2005) ("the *Anderson* case"), particularly with regards to who is to blame for the damage or loss of honey bee colonies as a result of bees foraging – or, as some courts have termed it, "trespassing" – on pesticide-treated fields, then carrying contaminated nectar and pollen back to their hives. Is a pesticide applicator to blame even though he can't possibly stop bees from foraging on contaminated fields? Or is a beekeeper to blame when he fails to confine his bees to their hives or move them to a safe location during spraying? On whom does the Minnesota Supreme Court place the blame in the *Anderson* case? How about the courts in other states? And what might the impact of the *Anderson* case be on future lawsuits between beekeepers and applicators? These are just a few of the questions that this article will attempt to answer.

No doubt, the *Anderson* case will have *some* impact on future lawsuits by beekeepers against pesticide applicators, but the question is: How much? That is hard to say. Mainly because, although a rule of law may seem black and white as written, when the rule is interpreted by a court, its meaning often turns into shades of grey. For instance, a bee caution on a pesticide label may read: "Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area." But what does "visiting" really mean? Is it the same as "foraging"? And how far does "the treatment area" extend? Does it cover only the agricultural crop that the applicator intends to target? Or does it also include non-targeted blooming crops or weeds that are reached by overspray or drift? Different judges may answer these questions in different ways, possibly leading to different meanings of the same words on the same label!

In truth, every judge brings to a court his own life experiences, prejudices, and preconceptions, so there can be as many interpretations of a rule of law as there are judges on a court of appeal or state supreme court (and the majority opinion wins!). But the outcome of a case may ultimately depend on what happens when the case is remanded or returned by a supreme court to the trial court that initially decided it, which is where the trial judge (or members of the jury) will determine how to apply that rule of law to the specific circumstances of the case. That is why it is not easy to predict the impact of the *Anderson* case on future cases, which will involve different sets of beekeepers and applicators in different sets of circumstances. But it is the role of a good lawyer to try and do just that – to predict the chances of winning his client's case based on the rules of law developed in past court cases. And in pesticide use lawsuits, it helps if his client – you, the beekeeper – has a basic understanding of the rules of law governing bees and pesticide misuse or misapplication. That way, you will know what kind of evidence to gather and preserve at the time of spraying, and can provide that evidence to your lawyer to help him prove to a court that you deserve to win your case.

Pesticide Use Lawsuits Before the *Anderson* Case

There are relatively few reported court cases or "case law" that *specifically* deal with the effect of pesticide misuse or misapplication on bees. Most of those reported cases discuss damage or loss of honey bee colonies caused by overspray or drift from the air or ground application of pesticides on neighboring fields ("pesticide drift cases"). And other than the *Anderson* case, there seems to be only two other cases – one from California and the other from Wisconsin – that fully discuss colony damage or loss caused by bees foraging on pesticide-treated fields, then carrying contaminated nectar and pollen back to their hives ("bee foraging cases").[1]

This lack of case law on bees and pesticide use makes each individual case take on added importance no matter the state where it is decided. This is true even though a rule of law in a decision by a court of appeal or supreme court in one state is "binding authority" (i.e., it must be followed) only by the trial courts of that same state; and though courts in other states may consider that rule of law for guidance in similar cases, they can choose to either follow the rule or ignore it. For example, a rule of law developed by the California Court of Appeal in a case about bees foraging on contaminated fields must be followed only by trial courts of the state of California; courts in other states may, but do not have to, follow the California rule and can develop their own rules.

(1) Pesticide Drift Cases

To better understand how courts have allocated blame or "liability" between beekeepers and applicators in bee foraging cases, it is best to begin with a discussion of how liability has been allocated in pesticide drift cases. And one of the first reported cases on damage or loss of honey bee colonies from pesticide drift or overspray, and one that is often relied on by other courts, is a decision by the California Court of Appeal in *Miles v. Arena & Co.*, 23 Cal. App. 2d 680 (1937) ("the *Miles* case").

In the *Miles* case, a beekeeper's 56 hives of bees were killed by pesticide dust (calcium arsenate) that drifted to his apiary during the treatment of a honeydew melon field one-half mile away. The beekeeper sued

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the grower and the applicator in a trial court, won, and was awarded $336.36 in damages.[2]

The grower and the applicator appealed the award of damages to the beekeeper, but the court of appeal agreed with the trial court, saying that: *"[i]n itself, dusting vegetables to kill pests that prey upon them is a necessary and lawful operation which the owner of the vegetables may perform, either himself or through his servants, or may have performed by an independent contractor. However, he should not do the dusting, or have it done, under conditions which would indicate to a reasonably prudent person that damage to his neighbor would result."*[3]

So, the general rule of law for allocating liability in the *Miles* case is that an applicator must not apply pesticides to crops when conditions, such as gusting wind, exist that would indicate to a *reasonable person* that the drift or overspray might cause damage to a neighbor. And if an applicator does apply pesticides under adverse conditions, causing damage to a neighbor's property (e.g., animals, bees, or plants), then the applicator will have to compensate the neighbor for the damage. This "reasonable person standard" is referred to, in legal terminology, as "negligence." A person is guilty of negligence when he fails to do something that a reasonable or careful person would have done (or he does something that a reasonable or careful person would not have done) under similar circumstances.[4] Therefore, an applicator has a duty to his neighbors to use reasonable care when applying pesticides; and if he does not use reasonable care, then he is guilty of negligence.

But how does the rule of law in the *Miles* case affect you? Well, if your honey bee colonies are damaged or lost as a result of pesticide drift or overspray, you may be awarded damages or compensation by a court if your lawyer can prove to the court that the applicator was negligent or did not use reasonable care when spraying. "Negligence" requires proof of four things: *"(1) the existence of a duty of care; (2) a breach of that duty; (3) an injury [or damage] was sustained; and (4) breach of that duty was the proximate cause of the injury."*[5] All four are explained in detail below.

(1) Duty of Care

A "duty of care" can be proven by showing to the court the rules of law developed in past pesticide drift cases, such as the *Miles* case, which impose on an applicator a duty to use reasonable care when applying pesticides. Just tell your lawyer about the *Miles* case (or better yet, give him this article), and he will be able to find a copy of the case.

(2) Breach of Duty

A "breach of duty" can be proven by showing that an applicator did not use reasonable care when applying a pesticide. Specifically, breach of duty requires proof that: First, because of the weather conditions existing at the time of spraying, the applicator knew (had actual knowledge) or should have known (had constructive knowledge) that the pesticide would drift to your apiary and damage or kill your bees. You will need to gather and provide your lawyer with evidence of the weather conditions (e.g., temperature, wind direction, wind velocity or speed) at the time of spraying. Second, the applicator, *at the time of spraying*, had actual or constructive knowledge that your apiary was located on neighboring land. And the best evidence of this would be the minutes (or a video or audio recording) of a community beekeepers' association meeting, attended by the applicator, in which apiary locations were discussed; or a written acknowledgment by the applicator that you personally notified him of the location of your apiary.

(3) Injury

An "injury" or damage can be proven by showing that some of your honey bees were killed by pesticide drift or overspray. You will need to provide your lawyer with: (i) color photographs and video of the dead and dying bees in your apiary; (ii) a detailed description of the conditions of the dead and dying bees (e.g., restlessness; inability to fly, except for short distances; trembling; aimless crawling and tumbling; paralysis of the bees' legs; unhooked rear wings that are held at abnormal angles[6]); and (iii) an authoritative beekeeping book that lists the common symptoms of pesticide contamination.

(4) Proximate Cause

"Proximate cause" can be proven by showing that the drift or overspray from *a particular pesticide used by an applicator* caused the death of your bees. You will need to provide your lawyer with: (i) the name of the pesticide suspected to have caused the damage; (ii) the date and time the pesticide was sprayed by the applicator; (iii) the proximity of the sprayed crops to your apiary; (iv) the residual toxicity of the pesticide; (v) a copy of the pesticide label, including the bee caution, if any; and (vi) test results from a laboratory analysis of the dead bees, confirming that the suspected pesticide poisoned them.

Unfortunately, success in court is not guaranteed even if your lawyer proves these four things, because you still may not receive compensation if the applicator presents enough evidence to the court that you somehow contributed to the death of your bees by not adequately protecting the hives during spraying (or after spraying, while pesticide residues remained active), even though *you* knew when spraying would take place.

A final word about pesticide drift cases: courts in most states follow the rule of law developed by the California Court of Appeal in the *Miles* case; so irrespective of the state where your apiary is located, be prepared to go into court with the type of evidence outlined above.

(2) Bee Foraging Cases

In bee foraging cases, courts have allocated liabil-

ity between beekeepers and applicators very differently (and much less friendly to beekeepers) than in pesticide drift cases. This is clearly evident in what may have been the first reported case to fully discuss colony damage or loss from bees foraging on pesticide-treated fields. It is a decision by the California Court of Appeal in *Lenk v. Spezia*, 95 Cal. App. 2d 296 (1949) ("the *Lenk* case").

In the *Lenk* case, a beekeeper's 518 hives of bees were poisoned (causing the loss of 14 tons of honey) by an insecticide containing arsenic trioxide used to treat tomato fields situated three-quarters of a mile to two miles away from the apiary locations.[7] In the trial court, the beekeeper argued that his bees were poisoned by pesticide drift during the dusting of the tomato fields, but the applicators insisted that the bees had picked up the poison by foraging on the pesticide-treated fields. The trial court agreed with the applicators and refused to award the beekeeper any damages.[8]

The beekeeper appealed the trial court's refusal to award him damages, but the court of appeal agreed with the trial court, saying that: *"[i]f [the beekeeper's] bees procured the poisonous compound from which they died while they were trespassing on the fields of other owners of land, it appears that the [beekeeper] could not recover damages unless the poison was distributed wantonly, maliciously, or with the deliberate intent to injure or destroy the bees. There is no evidence in this case of such wanton or malicious conduct. Under such circumstances there was no duty on the [applicators] or the owners of the land to protect [the beekeeper's] trespassing bees from the danger of said poisonous compound."*[9]

So, the rule of law for allocating liability in the *Lenk* case is that if colonies are damaged or lost as a result of contamination by pesticides picked up by the bees while foraging or "trespassing" on pesticide-treated fields, the applicator does not have to compensate the beekeeper for the dead bees unless he was reckless in spraying the fields, or sprayed with a malicious or deliberate intent to kill the bees.

In the *Lenk* case, the beekeeper was personally notified by the applicators of the time when the crop dusting would begin; they even offered to use their trucks to help him move his hives to a safe location. The beekeeper not only refused their help, but also neglected to take any steps to protect his bees. This led the court of appeal to conclude that his own unreasonable conduct or negligence contributed to the death of the bees.[10] In other words, the beekeeper was found guilty of "contributory negligence," which means that his failure to take the precautions to protect his bees that a reasonable person would have taken under similar circumstances contributed to the death of the bees.[11] Unfortunately for the beekeeper, his contributory negligence barred him from recovering any damages.[12]

And how does the rule of law in the *Lenk* case affect you? If your honey bee colonies are damaged or lost as a result of the bees foraging or "trespassing" on pesticide-treated fields, you may be awarded damages or compensation by a court if your lawyer can prove to the court that the applicator applied the pesticide recklessly, maliciously, or with the deliberate intent to kill your bees. Otherwise you are out of luck.

What's more, when you know that the fields where your bees normally forage are going to be sprayed with a toxic pesticide, *you* must be proactive and take reasonable precautions to protect the bees during spraying and while pesticide residues remain active: Either confine the bees to their hives or move the hives to a safe location. If you don't take any precautions, the death of the bees might be blamed on your own contributory negligence, which might—depending on the laws of the state where your bees died—prevent you from recovering any damages.

In bee foraging cases, courts in most states follow the rule of law developed by the California Court of Appeal in the *Lenk* case.[13] So, again, irrespective of the state where your apiary is located, be prepared to go into court with evidence that the applicator may have acted recklessly or maliciously during spraying, and that you took reasonable precautions to protect your bees.

Another reported case to fully discuss colony damage or loss from bees foraging on pesticide-treated fields is a decision by the Wisconsin Supreme Court in *Bennett v. Larsen Co.*, 118 Wis. 2d 681 (1984) ("the *Bennett* case"). The *Bennett* case, along with the *Lenk* case, are the two decisions that other courts usually consider when resolving pesticide use lawsuits involving the death of foraging or "trespassing" bees.

In the *Bennett* case, beekeepers suffered damage or loss of several honey bee colonies after their bees foraged on neighboring sweet corn fields that had been aerially sprayed with the pesticides *Sevin* and *Lannate* to kill corn borers and earworms. The beekeepers sued the applicators, claiming that the applicators were negligent because they had not followed the bee caution on the pesticide label. They also argued that pesticide spraying should be considered an ultrahazardous activity, and that the applicators should be held strictly liable for the damaged colonies.[14] "Strict liability" means that the applicators would be held responsible for the dead bees even if they were *not* negligent and had used reasonable care when applying the pesticides.[15]

When both the trial court and the court of appeal ruled against the beekeepers, they took their case to the state supreme court. But the supreme court made short shrift of the beekeepers' request to hold the applicators' strictly liable, saying that: *"the application of pesticides is a necessary and beneficial activity to ensure the production of adequate and healthy food and that its value to the people of [Wisconsin] outweighs the potential for harm. Accordingly pesticide application is not an ultrahazardous activity warranting the application of strict liability for resulting harm."*[16]

In the *Bennett* case, the state supreme court did not want to refer to bees as "trespassers," since, unlike a typical trespasser, a landowner cannot keep bees from entering and foraging on his land.[17] Still, the supreme court developed a rule of law similar to the one in the *Lenk* case, saying that: *"because land possessors have the right to reasonably use their property as they see fit, and because bees tend to enter property and there is little the land possessors can do to prevent their entry,*

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there should be no common law duty owed to protect the bees on the property, except that the land possessor cannot intentionally or wantonly destroy the bees. However, this is not to say that ... land possessors may not have a duty toward bees on the property imposed by statutes or administrative regulations, which have the effect of modifying the common law."[18]

In simpler terms, the rule of law for allocating liability in the *Bennett* case is that if colonies are damaged or lost as a result of contamination by pesticides picked up by the bees while foraging on pesticide-treated fields, the grower or applicator does not have a "common law duty" (i.e., a duty that comes from past reported court cases or case law, such as the *Lenk* case) to protect the bees on his property, but he cannot act recklessly in spraying the fields, or spray with a malicious or deliberate intent to kill the bees.

More importantly for a beekeeper, this rule of law also says that *even though a grower or applicator does not have a common law duty, he may still have a "statutory duty" (i.e., a duty that comes from a statute or administrative regulation) to protect the bees foraging on his property.* For example, suppose your state's pesticide use statute reads: "It is violation of this statute to use a pesticide in a manner that is contrary to the label directions." Then the duty imposed by that statute on a pesticide user is to follow the label directions. And if the pesticide user does not follow the label directions, he may have to pay for your damaged or lost honey bee colonies regardless of whether the bees contracted the poison by foraging on treated fields or by drift or overspray. But, *"[a]s long as the pesticide user follows label directions, there is no liability for damage to bees on the property at the time of spraying or to bees that enter the property later, unless the pesticide user causes damage intentionally or wantonly."*[19]

What you need to remember from the *Bennett* case is that courts consistently refuse to hold applicators strictly liable for damaged or lost honey bee colonies, which means that you cannot simply walk into court and say that your bees are dead and expect to be compensated. You must also present evidence showing how the bees died (by pesticide drift or by foraging on pesticide-treated fields), and that the applicator's negligence, recklessness, or maliciousness caused their deaths.

In bee foraging cases, the rules of law developed by the California and Wisconsin courts in the *Lenk* and *Bennett* cases will probably lead to a victory in court for the applicator; unless, of course, your lawyer can prove to the court that: (1) the applicator applied the pesticide recklessly, maliciously, or with the deliberate intent to kill your bees; or (2) your state's pesticide use statute makes it a crime or violation to not follow the directions on a pesticide label *and* the applicator did not follow those directions. And since courts in most states follow these rules, irrespective of the state where your apiary is located, this is the type of evidence you may have to provide in order to win your case.

Conclusion

It was against this legal backdrop that Jeffrey Anderson and other beekeepers sued the State of Minnesota, Department of Agriculture and other pesticide applicators for the damage or loss of their honey bee colonies caused by the bees foraging on poplar groves sprayed with the pesticide *Sevin*. As mentioned earlier, in bee foraging cases, courts in most states follow the rules of law in the *Lenk* and *Bennett* cases. However, the Minnesota Supreme Court in the *Anderson* case does not, instead developing its own rule.

What is the Minnesota rule? And will it affect the way other states choose to handle pesticide use lawsuits involving "trespassing" bees in the future? Those will be the topics of discussion in Part 2 of this article, in the August issue. BC

References

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3. *Miles v. A. Arena & Co.*, 23 Cal. App. 2d 680, 683 (1937).
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6. *See* Murray Loring, Bees and the Law 55 (1981).
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9. *Lenk v. Spezia*, 95 Cal. App. 2d 296, 302-303 (1949).
10. *Lenk v. Spezia*, 95 Cal. App. 2d 296, 304-305 (1949).
11 *See* Black's Law Dictionary 1033 (6th ed. 1990).
12. *Lenk v. Spezia*, 95 Cal. App. 2d 296, 305-306 (1949).
13. *See Bennett v. Larsen Co.*, 118 Wis. 2d 681, 691 n.3 (1984); *Anderson v. State of Minnesota, Department of Natural Resources*, 693 N.W.2d 181, 187 (Minn. 2005).
14. *Bennett v. Larsen Co.*, 118 Wis. 2d 681, 685-688 (1984).
15. *Bennett v. Larsen Co.*, 118 Wis. 2d 681, 703 (1984).
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17 *Bennett v. Larsen Co.*, 118 Wis. 2d 681, 691 n.3 (1984).
18. *Bennett v. Larsen Co.*, 118 Wis. 2d 681, 691 n.3 (1984).
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FIGURING Pesticide Loss COSTS

James C Bach

Background:

Bees, and the hives they live in are damaged every year from queen loss, pests and diseases, genetic abnormalities, vandalism, theft, accidents, fire and agricultural pesticide applications. During 24 years as the Washington State Apiarist, my major interests in beekeeping were colony behavior and biology, how beekeeper management affected colony behavior and production, and beekeeping economics. Over the years beekeepers have asked how to approach an economic analysis of their business with questions such as:

1. How do I know I'm making a profit?
2. How much does it cost to operate a hive of bees for a year?
3. How much does it cost to produce a pound of honey?
4. How do I estimate the economic impact of a bee loss due to agricultural pesticides?
5. Where can I go to get some education on the economics of beekeeping?

These are questions that every beekeeper eventually considers to some degree. Yet, little is published on these specific topics. The few documents I have seen that purported to estimate the economics of individual situations like the entry of Africanized Honey Bees into the U.S., or highway transport of large numbers of beehives, did not address the most important and highest cost item in bee management i.e. labor! Beekeepers I've heard discussing their hive management costs only considered out of pocket beekeeping expenses – not labor, retirement funds, health plans or a return on their investment.

I will answer the above five questions and also provide the analysis that should be performed to create the answers.

1. How do I know I'm making a profit?

A. First, document gross income from sales, rentals and services provided to others. These include wholesale and retail honey sales, propolis, wax and pollen sales, renting hives for pollination, queen, nuc and colony sales, and trucking income.

B. Second have a set of records that document accurately all expenses incurred by the business:

- maintain receipts for all funds expended,
- the time spent in planning relating to the business,
- attendance at meetings for education and networking,
- windshield time when driving to and from apiaries intra-state and interstate,
- time to pickup all supplies related to the business,
- time spent on hive and colony management, supering and transporting hives, harvesting and extracting,
- all mileage related to the beekeeping business including trucking activities performed as a service for others,
- record and bookkeeping time/cost, whether you do it or hire it done, including computers, printer and software,
- costs of marketing, advertising, promotion (National Honey Board assessment), sales,
- cost of interest paid on borrowed money,
- costs of equipment and vehicle upkeep, repair, and fuel
- costs of beekeeping equipment, queens, nucs, colonies in hives, hive rentals, medications and bee feed,
- costs of utilities (electricity, gas, telephone) used by the business,
- time and costs of all temporary and permanent employees including wages, benefits, and other employer costs,
- owner/manager time records for trucking, colony and business management, and pollination activity, and
- percentage return on the monetary investment you made in your business (should be at least equal to the highest interest paid on bank certificates).

C Additional expenses that may be calculated either as business expenses or personal expenses included in the owner/manager wages include:

- a retirement/investment account, and
- a family medical plan.

The gross profit is determined by subtracting the business expenses from the gross income (A – B). The gross profit minus the salary paid to the owner/manager and his/her benefits (medical plan, retirement account), and a return on their investment in the business, equals the net profit. Net profit is either invested for the owner/manager's future benefit or re-invested in the business as operating capital.

Owner/managers take a monthly "draw" of funds against the earnings or profit of the company. It is common in small businesses that the owner/manager's time is not recorded. Their salary, retirement funds, medical plan and return on their investment is included in the business profit. This practice often means that

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there is no formal medical or retirement plans nor a calculated percent return on their investment of money into their business. It also results in scaling down the value of the owner/manager's time spent in the business. If the gross profit is divided by the owner/manager's average work time per week times 52 weeks per year, their hourly salary will usually appear to be quite low. This method of calculating owner/manager worth wears out when the personal satisfaction gained in operating the beekeeping business runs low. Fifty percent of small businesses go broke in five years because of this and other business management phenomena. Beekeeping businesses are negatively impacted by down turns in the business climate and markets, and when uncalculated impacts of honey bee pests or other items reduce the cash flow and viability of the business.

You know when you are making a profit if your gross income exceeds business expenses, the owner/manager makes a reasonable income per hour ($20-25), family medical plans and retirement/investment accounts are paid, and you have a reasonable rate of return on the money you invested in the business (± ten percent). Remember too that your income and expenses will vary each year so also consider them on five and 10 year averages. It will often take five years to recoup losses encountered in just one bad year.

2. How much does it cost to operate a hive of bees for a year?

Divide the total business expenses (**1** B, or B + C) by the number of production colonies you operated during the year

Production colonies are those that made you income during the year. They are those colonies you were able to rent for pollination and/or that produced a honey crop. Don't count the nucs/splits you made or purchased, unless you were able to rent them for pollination, or they produced some honey for sale. If they produced one quarter of the average production of over wintered colonies, count one in every four as production colonies. If they produced half of the average production of over wintered colonies, count one in every two as production colonies. If you used their honey to feed other colonies, don't count them as producers in their first year because they didn't produce income even though they may have saved you some feed costs. Don't count those colonies that failed to produce because of queen losses or other causes.

You'll be surprised at the percentage of production colonies versus the total number of hives containing bees that you had in your apiaries. Ideally these two numbers should be within two to five percent (instead of the average 70% I heard in the Fall and Winter of '04-'05.)

3. How much does it cost to produce a pound of honey?

If you only produce honey in your operation, divide the total business expenses (**1** B, or B + C) by the total number of pounds of honey produced by your production colonies as defined in **2**.

If you also rent bees for pollination, and you want to calculate pollination costs and income separately from your honey production costs and income, you can divide up the costs and income as follows:

- Consider the expenses and time you spent on your colonies from the time they arrive in a southern state to when they are back in your home state and following pollination in your home state, including return trucking expenses, as pollination costs. Then use your pollination income for that period to calculate what it costs to manage a pollinator colony.
- Use the time and expenses starting with preparing colonies for honey production (following pollination activities in your home state), including trucking time and costs back to the southern state in the Fall as honey production costs. Divide the honey production costs by the number of honey production colonies as the cost per hive to produce honey. Divide that cost by the average pounds of honey produced to get the production cost per pound.
- Or, calculate the percentage of your honey income to your gross income, take the same percentage of your gross expenses and divide it by the number of pounds of honey produced to get the cost per pound of honey. The same can be done to get the cost per pollinating colony.

4. How do I estimate the economic impact of a bee loss due to agricultural pesticides?

By calculating the pounds of bees lost (D), times the value of a pound of bees in dollars (E), plus queen replacement costs (F_{1-4}), plus the labor and other expenses of returning the colony to the production line (G), plus the value of lost honey production (H), plus the value of lost pollination rental fees (I), plus the value of hive and comb damage from all causes (J) and plus the loss of profit income from damaged colonies (K). (D x E) + (F_{1-4} thru K) equals the total damage sustained.

The loss of bees in a colony from various causes must be estimated to determine the impact on the beekeeping operation and the profit and loss statement. It is also required if you wish to recuperate your loss from a person(s) that caused the loss. It is necessary to determine some measure of estimating the extent of the loss, the number of times it occurs in a year, the value of each loss and its ultimate impact on the economics of the operation and the family that depends on the income from the business.

Calculating losses:

D. At 55° F (12.7° C) roughly one pound of bees (3,500) will cluster on both sides of one deep Langstroth comb. The number of dead bees in front of a hive as a result of agricultural pesticide damage is roughly one half of the total number of foraging bees damaged but varies depending on the particular pesticide used and the distance between the application site(s) and the apiary. Another way to calculate the bee loss is to compare the average colony strength (number of deep combs fully covered with bees) of colonies that are not damaged in apiaries in

other areas to the average strength of those alleged to be damaged by pesticides. The difference in combs of bees is the damage measurement. If you only had one slight or moderate pesticide loss you will only need to calculate the pounds of bees lost. But some queens may also be lost in moderate bee kills.

Western or Dadant combs (5.25" deep) are 62% and ¾ frames (7.25" deep) are 79% of the size of a deep comb. If you use these equipment sizes multiply your number of combs of bees by these percentages to obtain an accurate estimate of the pounds of bees they will hold.

E. Estimate the value of bees per pound by calculating the average cost of replacement pounds of bees, plus shipping costs, by consulting supplier ads in the national bee industry journals.

F. Estimate the value of queens lost by calculating the average cost of replacement queens, plus shipping, by consulting supplier ads in the national bee y journals.

If you had a slight bee loss you ill not need to estimate queen replacement costs. If you had a moderate bee loss you may lose up to 25% of queens (F_1) in your colonies within 30 days depending on the strength of the honey flow and other variables at the time of the loss. Additionally, you may lose up to 10% of replacement queens introduced to moderately damaged colonies (F_2). If you had a severe bee loss you may lose up to 95% of your queens (F_3) within 30 days and up to 50% of replacement queens introduced to severely damaged colonies (F_4).

You can either use the loss numbers I have proposed or you can make your own estimate of the initial loss and calculate the subsequent impact loss at a later date. Include both estimates in your application for damages to your insurance company or attorney for litigation purposes.

G. Calculate the cost of the owner/manager time, and hired labor costs that will be necessary to combine damaged colonies and feed them. Include feed costs, vehicle, mileage and travel time costs, equipment replacement costs if pollen combs were contaminated by a pesticide residue, or the hive was damaged by vandals. If the moderate loss necessitates the combining of some colonies to put the most colonies back on the production line, then calculate the lost colonies as though they were severely damaged by the pesticide incident and estimate the monetary damage accordingly.

The extent of remedial action you take to overcome the damage to your colonies may prolong the impact of the pesticide damage. If you do not remove contaminated pollen combs the residue they contain may continue to kill bees up to 18 months later depending on the pesticide characteristics. If you continue to use old combs (10 years old or more) the colony will regain its strength slowly compared to replacing old comb in the brood nest with new comb or some new comb and foundation plus feeding the colony. If the bees are not collecting their required amount of pollen, feeding a supplement will enhance colony recuperation.

H. Calculate the value of lost honey production on moderately and severely damaged colonies by subtracting their average per colony production from the average production of a nearby un-damaged apiary. It there isn't another apiary within five to ten miles you can use the previous five year average production per colony from that area or of your operation. You will need good records to support your calculations if you engage in litigation or go to court to recoup your losses.

In addition, you may include the value of bees wax that was not produced because of the honey crop loss.

I. If you only experience one moderate loss early in the Summer, your colonies may build up sufficiently to Winter as normal strength colonies. If so, then you won't lose pollination income in the following year. If you experience a severe loss you will lose one or more rental fees the next year on all colonies that eventually died from the pesticide incident unless you can purchase replacement production colonies from someone else. Be sure to calculate this purchase price, trucking time and other costs into your damage impact estimate.

J. The value of hive damage by vandals, bears or other causes can be calculated by determining the replacement cost of the equipment plus the labor costs of assembly, or the cost of purchasing replacement hives of bees. Cost estimates of lost combs because of pesticide residue contamination can be calculated by using the purchase price of combs from suppliers or another beekeeper

K. Calculate the value of lost profit income by calculating the average profit per hive from the previous five years and multiply it by the numbers of hives damaged by the pesticide incident.

EXAMPLE – How losses impact expenses per production colony and per pound of honey:

Beekeeping operation: 2,000 production colonies; interstate migratory
Expenses and income: 61% interstate pollination
39% honey

Note: My data reflects a hypothetical operation with information gathered in 2004 from beekeepers and industry journals. You can plug in your data, do the calculations and determine the profit/loss viability of your business.

Gross income:

Pollination Income:

2,000 x $45 orchards in CA =	$90,000
2,000 x $40 orchards in WA =	80,000
500 x $22 vegetable seed in WA =	11,000
Sub total =	$181,000

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Honey Income:
2,000 x 80 lbs. ave.=160,000 lbs @ $.65= $104,000

Wax Income:
160,000 (180 lbs. honey = 1 lb. Wax) = 889 lbs. wax @ $1.90 / lb. = $1,689

Total Gross Income (1 A): $286,689

Gross Expenses (1 B or B+C):
1B – operating expenses on 2,000 colonies = $235,738

1C – retirement account ($500/mo. tax deferred) = $6,000
- family medical plan ($500 x 12 mo.) = $6,000
$247,738

Owner/manager wages (40 hr/wk x 52 wks @ $20/hr) = $41,600

Total Gross Expenses: $289,338
Net Profit ($2,649)

Income per colony (1A):
$143.34 ($87.44 pollination, $55.90 honey)

Expense cost per colony (1B):
$117.87 ($71.90 pollination, $45.97 honey)
(1 B + C):
$123.87 ($75.56 pollination, $48.31 honey)

Production cost per pound of honey (honey production only on 2,000):
(1B):
$45.97 ¸ 80 lb. = $.575 (compare income per lb. @ $.65)
(1B + C):
$48.31 80 lb. = $.604 (compare income per lb. @ $.65)

If we consider that the beekeeper loses 10 to 30 percent of their colonies from agricultural sprays, mites or other problems during the year so that they are not on the production line, then the remaining colonies must bear the expenses of the damaged and dead colonies as well. This will increase the cost per colony for pollination activities and honey production. The impact will depend on the time of year the loss or damage occurred and the percent of average production by the lost colonies before their demise. But for simplicity I have just calculated a straight percentage loss below and its impact on cost per pound of honey.

Impact of colony losses:
10% of 2,000 = 200 = 1,800 production colonies
20% = - 400 = 1,600 " "
30% = - 600 = 1,400 " "

expense per production colony is now:
10% loss = $130.97 (x .39 = $50.70/colony 80 lb. = $.634/lb.)
20% loss = $147.34
30% loss = $168.38

honey production expense per pound on production colonies is now:
10% loss = $.634 (compare income per lb. @ $.65)
20% loss = $.718 (compare income per lb. @ $.65)
30% loss = $.821 (compare income per lb. @ $.65)

If gross expenses 1C (retirement and medical) is included in owner/manager wages then gross expenses of $289,338 $12,000 = $277,338 or a net profit (return on investment) of **$9,351** = 3.3 percent of gross income. Another way to make the net profit look different is to lower the owner/manager wages.

5. Where can I get some education on the economics of beekeeping? Attend a business administration class at a community college or business school, check references at your local library, and seriously consider working with both an ag business and tax consultant to be certain you are taking advantage of every savings possible, and that you are including all costs. BC

Jim Bach was the Apiary Inspector for Washington, then became a Pesticide Compliance Investigator.

Summer Increase

Larry Connor

Safer and Better . . .

Rollie probably says it best. After pushing hard all Spring to pick up packages, install packages, prepare over-wintered colonies for fruit bloom pollination, move bees in – and out – of orchards, super hives for the nectar flow, AND try to work a full time job, by sometime in June you need a few days away from the bees.

Then it hits you. The queen cells you grafted from those expensive breeder queens are about to emerge and your free time is over. Like a two act play, you had a brief intermission, but now you need to work hard and pay attention to see how the rest of the bee season is going to turn out.

Rollie Hannan Jr is a Cornell graduate, where he worked with Dr. Roger Morse. He also obtained commercial experience working with Andy Card of New York. He is the president of the Connecticut Beekeepers Association, works a full-time job for the Conn. Ag. Station, and runs a few hundred colonies. As a member of a longtime farming family in the state (one rarely known for it's farming efforts), Rollie knows that his biggest advantage in Connecticut is the ready market for his honey and hive products. He also pollinates several large orchards in state.

Any good ideas in this article came from Rollie; the rest are mine.

Many northern State and Canadian beekeepers are confronted by the tremendous pressures of a compressed season of beekeeping – for many, from late March to early June. That's less than three months. Many well organized, highly energetic beekeepers are able to meet their management objectives during this time period, but for the rest of us, there are many chores waiting when the first round of supers are finally in place. Anything that delays full activity, from rainy weather to truck problems to even a brief illness will throw the schedule out the window. If, of course, you ever actually had a schedule.

A bit to the south, beekeepers are faced with very early nectar flows from plants like tulip popular. For these beekeepers, the major nectar flow is over by late May or early June, and the remainder of the season looms heavily. As Summer arrives, the beekeepers are faced with the challenge of making up Winter losses and growing the operation.

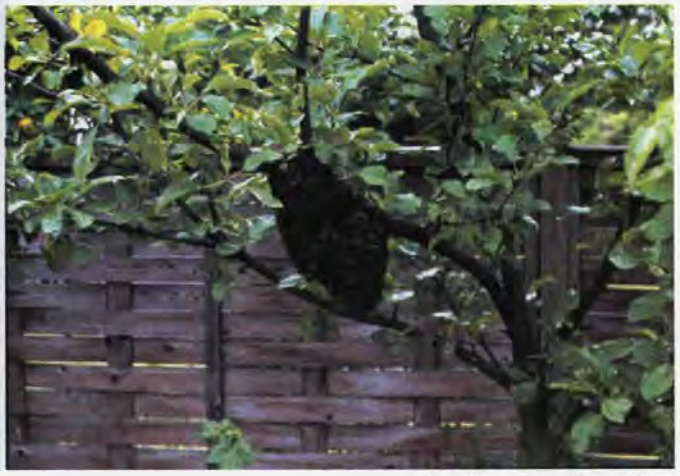
For both groups of beekeepers, making increase colonies in the late Spring/early Summer is a viable alternative, spreading the season into July and even August. There are supporting biological reasons why Summer increase works:

1 Late Spring and early Summer queens – some of the best queen rearing conditions exist in the late Spring and early Summer, often coinciding with your area's natural swarming season. Small beekeepers may use natural swarm cells to requeen colonies, or adapt one of the several queen rearing methods that does not require the transferal of larvae (methods by Miller, Smith and Jenter), or transferring larvae in what is commonly called the Doolittle method of queen rearing (I don't think Doolittle ever actually used the term "grafting" in his original work).

2. Summer bees, swarms, nectar flows and population management – Most beekeepers have seen charts or graphs showing how the bee population peaks in late Spring or early Summer and corresponds to the nectar flow for your area. If you have a flow from mid June to mid July from clovers, the brood peaks (or should) three to six weeks *prior* to that flow. This allows the future honey gatherers to emerge, mature and start flying. It is commonly felt that most brood

The result of being just a little late.

Swarms are one way to divide a colony.



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One way to tell where the queen larva come from is to use different colored plastic cups.

rearing taking place during a nectar flow is reduced in number of eggs laid per day, and the bees that are produced during this time period will probably not contribute to honey gathering.

When colonies are running at full steam, it is very possible that they will swarm. Unless you have an active swarm prevention plan in place, most of the colonies with older queens are going to swarm, perhaps several times. I hold the opinion that many beekeepers rarely see these swarms because they are so busy and spread so thin that their out-apiary colonies issue swarms and they are barely aware of the fact. This is especially true if the beekeeper is visiting colonies – actually getting into the brood nest – less than once every three weeks. If you checked the broodnest before apple blossom and you may check them again over the July 4th weekend, you will probably not know if some colonies swarmed or not unless you had a marked queen and there is now a new queen in the hive. Most beekeepers would be better off developing a plan that manages colony populations by taking brood from strong colonies to boost weaker colonies, and by making up increase colonies (nucleus or full sized units). This practice may start before fruit bloom, and continue on a two to four week rotation until mid Summer Each apiary visit potentially generates new colonies or nuclei for the beekeeper This way the beekeeper has control of the bees, and maximizes their utility to his or her operation. Lost swarms are a loss of your investment in time, equipment usage, medication, feed, and your emotional energy. Repeat that mantra as you make Summer increase.

3. A break in the mite cycle – Most beekeepers understand that a break in the brood cycle interferes with *Varroa* mite population buildup. Such a break may occur at any time in brood rearing, but a midseason break will effectively truncate rapidly growing parasite numbers. This is accomplished by creating a queenless period of time in the Summer when brood is removed from one colony to make up a nucleus colony and a queen cell is used to provide the new colony's queen. Combined with mite-tolerant stocks, mechanical devices like a screened bottom board, and drone trapping (destructive removal of sealed drone brood), a break in the brood cycle provides one more tool the beekeeper may use to manage *Varroa* populations without using chemicals. These methods are usable during a nectar flow since no chemical of any type is introduced to any harvested honey.

4. Using breeder queens – Right now we have a wealth of valuable genetic material offered in the form of breeder queens. Yes, they can be expensive. But the use of SMR, hygienic, Russian, New World and the other stocks in late Spring and early Summer will allow you to produce daughter queens, mated in your own apiary, so you may evaluate these colonies prior to Winter My instinct is to incorporate several of these genetic stocks into you own colonies, using open mating to virgins from these grafting mothers. If the breeders are vigorous, you may choose to stimulate drone production from these queens and get pure drones within your area. At the same time, reduce the number of undesirable drones (via drone brood destruction) in the same area. Rollie uses different colored plastic queen cups (from Jz-Bz's in Texas and several supply companies) with each color representing a different breeder queen.

5. Queen rearing from local survivor stocks – In my opinion, the largest behavioral shift that needs to occur in this industry is to develope vigorous, productive stocks from local survivor stocks. These are colonies that are tolerant of *Varroa* infestations, either naturally or from introduced genetic material from purchased breeders, AND are successful in all other ways: wintering ability, Spring buildup, honey production, disease resistance (hygienic behavior), and workable under unfavorable conditions. These local stocks must be propagated by local beekeepers, or under some agreement with a queen producer in a southern or western state (some allowance must be made for non-local drones). Such a two-way exchange would be a way to keep a viable queen and package bee business in the United States. Remember, where a queen is reared is not as important as how well she is produced. A late May, early June batch of queen cells from survivor stock colonies from cooperating northern beekeepers could be placed in packages or shipped directly for use in increase colonies. Have you asked your queen producer if he or she would graft from your survivor stock?

Alternatively, become a queen producer in the North. Doing it in the early Summer is an ideal time, fitting into the rest of your beekeeping activities. To be successful, northern queen producers must educate queen and queen cell users to make Summer increase.

Advantage of Summer Increase

So far we have established that the Summer increase colony is produced at a better time for many beekeeper's schedules and optimizes the colony's population cycle. We have looked at the biologically related areas why this timing makes sense. Now lets discuss the advantages of doing this in overall colony management.

Summer increase achieves that elusive goal of Summer requeening. Most beekeepers agree that Summer is a grand time to replace old queens – she has done her job, bringing the colony population to the flow for one or two seasons. Unfortunately, finding queens in the Summer is very difficult, even for the most experienced beekeeper

Summer queens give the beekeeper two management tools: first the beekeeper is able to make sure the queen she or he actually wants is in the colony (has the queen cell emerged, mated and is she laying correctly?). Second, the colony may be evaluated for brood pattern and later for other characteristics after the bee population has turned over to bees of the new queen. Several quick but purposeful inspections (as when bees are moved to full sized equipment) will tell the beekeeper if the new stock or new queen is meeting expectations. Third, if you are raising queens from cells you can evaluate the queen for physical characteristics like color, overall size and tendency to run or remain quiet on the comb.

It is generally accepted that young queens are unlikely to swarm the first season IF they have not already generated a season's worth of bees. This is important to busy beekeepers during that March-June interval when they are so busy they cannot check every frame of every hive for queen cells. Any natural, instinctive reduction in the swarming instinct will be fully appreciated by the beekeeper Summer increase queens do raise brood in the Summer, of course, but have not taken a colony through a full season.

Brother Adam, developer of the Buckfast strain of bees, used a variation of Summer colonies at Buckfast Abby. In his system, the nucleus colonies were permanent, and four nucleus colonies were made from one large hive. These colonies were permanently sited in an often photographed apiary in a remote area outside of Devon. He installed new queens into the nucleus colonies each June, and monitored them throughout the Summer and the next Spring. When I visited Bro. Adam in 1983, his assistant showed me these nucleus colonies and emphasized the value of putting one-year-old, tested queens into production hives. Adam argued that by putting a queen through the Winter and observing her Spring buildup he was able to predict her overall success as the mother of a full-sized colony. This worked very well as he worked to select against acarine (tracheal mite) disease, while maintaining colonies that needed to be productive in terms of honey production.

American beekeeper G.M. Doolittle, often called the father of modern queen rearing, kept bees in New York outside Syracuse. He maintained permanent out-apiaries, with a set number of colonies in each one. If a colony was lost, Doolittle used Summer increase as his means of replacing that colony. He raised queen cells in his home apiary and would carry ripe cells to the out-apiary by horse and wagon or by automobile. In June he would remove frames of sealed and emerging brood from strong colonies and make up a new colony. He shook all bees off all combs, carefully doing so as to not harm the queen. He would make up strong colonies, with added frames of honey and pollen on the outside. He then placed the bee-free box of brood over a queen excluder over the brood area of another strong colony, and closed the cover. He returned a few hours later to find the nurse bees from the strong colony covering the brood. Doolittle then moved the hive to its permanent location in the same apiary. He did not fear the loss of bees because the young nurse bees had never flown, and did not know the way back to their original hive. Plus, he argued, newly emerged bees would help these bees maintain the brood nest. Since it was June, the chance of extremely cold weather was hopefully over

For Doolittle, these increase colonies were as strong, brood wise, as other colonies in the apiary. By adding a queen cell from his breeder stock, he maintained control of the genetics of the hive. Once the queen was mated and laying this colony was worked just the same as others in the apiary.

Doolittle was extremely passionate about keeping three frames of honey in every colony at all times, and he made his increase colonies with plenty of added honey. He argued that whenever a colony had less than 20 pounds of honey it behaved differently than if it had more; with more honey the colony was more expansive and performed better

In 1905, Doolittle worked an out-apiary and recorded his observations. At the one hundred year anniversary of this work, I have reprinted this book through Wicwas Press[1]. BC

One of Brother Adam's beeyards.

[1] G.M. Doolittle. A year in an out-apiary. Wicwas Press, 175 Alden Avenue, New Haven, CT 06515. Paperback $20 postpaid. Email ebeebooks@aol.com or phone 203.397.5091.

Honey Plants

Connie Krochmal

The Mint Family

Summer flowers are very welcoming to bees. While some Spring flowering plants can be damaged by late frosts, the latecomers usually bloom reliably year after year Many of these seasonal species tend to be herbs in the mint family.

This diverse group includes over 3,000 species. For the most part, these are either perennials or annuals with a few shrubs and biennials in the bunch. Members of the mint family are easily recognized by their square stems. Their leaves occur in whorls or opposite each other In general, the foliage is aromatic.

With two-lipped corollas from which the group gets its name (Labiatae), the flowers open terminally and/or from the leaf axils in spikes or clusters. They often begin blooming in July, and continue for several months. These provide an abundance of nectar and pollen.

The mint family produces very aromatic, herbal honeys. If they crystallize, the aroma can diminish somewhat.

Monarda sp. are all attractive.

Unless noted otherwise, these plants prefer full sun, and a dry, well-drained soil. Now, let's look at some specific members of this group.

ANISE HYSSOP (*Agastache foeniculum*)

Anise hyssop will grow in most average soils, and tolerates partial shade. Native to the Midwest, this is hardy to zone four. All parts of this plant have a licorice-like scent. This short-lived perennial reaches 1½ to three feet in height. It blooms until a hard freeze. Very popular among bees, its vivid bluish-purple flowers open on six-inch-long spikes.

Anise hyssop produces nectar throughout the day. It is a major bee plant in the Northeast, and Midwest. This fine honey has an excellent mint-like flavor and heavy body. With a wonderful aroma, it is light colored.

BASIL (*Ocimum basilicum*)

With so many varieties available, the overall size of the basils varies from one kind to another. In addition to dwarf, rounded ones, there are also tall, bushy basils. The toothed, opposite leaves are very aromatic. Oval in shape, they tend to curl along the center Usually in July or August, the small flowers open in terminal spikes. Typically, these will be white, but some varieties have purple or pink blossoms.

BLUECURLS (*Trichostema spp.*)

With over 16 species throughout the U.S., bluecurls differ in hardiness. There are annuals, perennials and shrubs among this group. These grow in the foothills, valleys, waste places, and old fields. The aromatic flowers open from August until frost. As the name indicates, these are usually blue, rarely pink or white. In the West, bluecurls are good species for bees.

These plants can yield a hundred pounds of honey per colony in good years. This mild honey is very white, granulating smoothly and quickly.

CATNIP, CATMINT (*Nepeta spp.*)

Naturalized throughout North America, these strongly scented perennials are hardy to zone three. They grow well in partial shade.

Catnips grow to three feet tall. The coarsely toothed leaves are gray-green above and whitish below. Downy white fuzz covers the leaves and stems. In tightly packed spikes, the white blooms with touches of pinkish-purple make their appearance from Summer through the Fall.

The catnips are important to beekeepers in the Northeast and Midwest, and to cats everywhere!

GERMANDER (*Teucrium chamaedrys*)

Hardy to zone five, this herb tolerates partial shade. It has naturalized in parts of the U.S. Over a hundred varieties are available.

Reaching two feet in height, germander is a dense growing shrub or perennial. After initially spreading along the ground, the slender, hairy

stems assume an upright position. The tiny, toothed leaves can be oval or oblong. Their lower surface is lighter colored. Opening in whorls from the upper leaf axils, the white spotted flowers are either white or purple.

Horehound (*Marrubium vulgare*)

Naturalized in some areas of North America, this species exhibits Winter hardiness to zone three. Horehound adapts well to poor soils. A bushy plant, it reaches one to two feet in height. The white, woolly down on the foliage and stems gives the plant a gray appearance. Present from July through September, the crowded whorls or clusters of white blooms emerge from the leaf axils.

This is a valuable honey plant, particularly in some western states. Horehound can yield over a hundred pounds of honey per colony under favorable conditions.

The honey can be greenish or any shade of amber. Very strong tasting, it tends to granulate.

HORSEMINT (*Monarda spp.*)

Represented by a number of species, horsemints can be annuals, perennials, or biennials. These native plants occur in woodlands, thickets, and along stream banks over much of the U.S. They're hardy to zone four.

The horsemints like a rich, moist soil, and thrive in partial shade. These can be three feet tall. The toothed, dark green leaves grow to six inches in length. Coming in a range of colors, they're typically red, pink, or purplish. These open terminally in tiers. Colorful bracts encircle the bases of the blossoms.

Horsemint is of particular value to beekeepers in the Plains and Southwest. Slow to granulate, the light amber honey has a minty flavor.

HYSSOP (*Hyssopus officinalis*)

Hardy to zone four, this bushy, many branched perennial reaches two to three feet in height. It tolerates both full sun and partial shade. Hyssop has small, linear, soft grayish foliage. Often hairy, this gives off a mint-like aroma. The blossoms open terminally in whorls. Though there are white-flowering varieties, blue and violet are the most common colors. Hyssop blossoms are well liked by bees.

LAVENDER (*Lavandula spp.*)

With over 25 species and countless cultivars, there are lavenders to suit every hardiness zone. While the English lavenders tend to be the hardiest, the Spanish and French ones dislike freezing temperatures.

All parts of these bushy, branching evergreens are aromatic. Reaching two to three feet in height, they feature narrow, gray-green leaves. These bloom from June to August. The dark mauve to vivid purple flowers appear in tall clusters or tiered heads. They're eagerly sought by bees.

Lavender produces one of the finest herbal honeys. It has a delicate, pleasing flavor. With very fine granulation, this is noted for its smooth body. Colors range from white, yellow, and gold to various shades of amber This can yield around 45 pounds of honey per colony per season.

Catnip, the cat's part *and the bee's part.*

LEMON BALM (*Melissa officinalis*)

Hardy to zone four, lemon balm adapts to full sun and partial shade. It's likely to spread when conditions are favorable. This upright, loosely branched perennial grows to two feet tall. With a lemon-like scent, the toothed leaves have a crinkled appearance. At one time, beekeepers customarily rubbed the inside of empty hives with the foliage to attract swarms. Lemon balm has small, yellowish or white blooms.

MINTS (*Mentha spp.*)

Suitable for sun and partial shade, the mints thrive in rich, moist soils. There are around 20 species, some of which have naturalized in North America. Given the right growing conditions, these can easily spread.

The mints are hardy to zone five. Depending on the species, the growth habit ranges considerably from upright to sprawling. The tiny flowers open in whorls and terminal spikes. These can be white or pink. Beekeepers in the Northeast, Midwest, and West rely on the mints for good honey crops.

OREGANO (*Origanum spp.*)

Hardy to zone five, these quick-blooming perennials can also be grown as annuals. They're one to two feet tall. Generally, the erect stems will be hairy. The leaves are often toothed. Appearing in terminal spikes, the blooms vary in color from pink or mauve to white. These make particularly good bee plants, and yield a honey with a mint-like flavor

ROSEMARY (*Rosmarinus officinalis*)

Rosemary is considered winter hardy only to zone eight, though certain cultivars can withstand somewhat colder temperatures. Elsewhere, it is grown as a pot plant.

This herb has white, scaly bark. A fast-growing, evergreen shrub,

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rosemary reaches six feet in height. The thick, needlelike leaves have no leaf stalks. They're greenish-gray above and gray below. The foliage is especially aromatic.

Rosemary blooms appear in clusters of two or so from the leaf axils of the previous year's growth. Considered a major bee plant in warm areas, rosemary can yield 130 pounds of honey annually per colony.

The honey has a rich flavor with an aroma like that of the plant. Clear, white, or water white, it granulates quickly and smoothly.

RUSSIAN SAGE (*Perovskia atriplicifolia*)

Winter hardy to zone five, this erect, woody perennial features whitish-gray stems that are usually cut back to the ground in early spring before the new growth emerges. Russian sage has scented leaves that are silvery-green on the upper surface and silver-gray underneath. These are oblong to egg-shaped. From mid-summer until frost, Russian sage sends up narrow flower spikes with deep violet to lavender-blue blooms. I never fail to see bees working these flowers.

SAGE (*Salvia spp.*)

Depending on the species, the sages can be annuals, biennials, or perennials. Hardiness differs from one kind to another Most will grow in an average soil, but garden sage and Clary sage require well-drained soils.

These erect plants range in height from one to five feet. Generally, they tend to have hairy stems. The broad, oblong foliage, sometimes downy, is often toothed and puckered.

The flowers open terminally in whorls or spikes. Colors include white, blue, and red. These start appearing in June, and continue until frost. With the exception of the red-flowering annuals commonly grown as bedding plants, all of the sages are good bee plants. In addition to the cultivated species, the wild ones attract bees as well.

Under good contitions, sages can yield 100 pounds of honey per colony. This has a mild flavor with a sage-like aroma. Sometimes, it granulates quickly It varies from clear white to pale yellow or amber

Mints are useful for flavorings, and for bees.

SAVORY (*Satureja spp.*)

Though there are over 30 species of savory, Summer savory and Winter savory seem to be the most widely grown kinds. These plants will be either annuals or semi-evergreen perennials with the latter being hardy to zone six.

Savory reaches ½ to 1½ feet in height. The soft leaves, up to an inch in length, are dark green or gray.

The blooms open in crowded clusters or spikes. Colors include white, pale pink, rose, and lilac. Pure savory honey is yellow or greenish.

THYME (*Thymus spp.*)

These exceptionally hardy evergreen perennials or shrubs survive Winters in zone four Generally, the thymes are under a foot tall. Displaying various growth habits from creeping to upright, there are over 300 kinds of thyme available. These plants are densely branched. Usually dark green, the dainty foliage has a rich fragrance. Their tiny blooms, mauve, pink, or white, appear in abundance. Bees are especially fond of the blossoms.

Thyme honey is very much in demand, particularly in comb form. Its thyme-like aroma doesn't diminish with time. The plants can yield anywhere from 40 to 120 pounds of honey per colony in most years. Either amber or golden with a good body, this has a distinctive, mint-like flavor that can be pronounced. It is slow to granulate. In the West, thyme is an important bee plant.

WOUNDWORT (*Stachys spp.*)

This vast group features several hundred species, some of which have ill-smelling foliage. They include annuals, perennials, and sub-shrubs. A number are native to North America, while some introduced ones have naturalized on a local basis. With the exception of the annuals, most are hardy to zone four or five.

The growth habits extend from sprawling to erect. Foliage is sometimes toothed. Some, such as the lamb's ears, have woolly leaves. In whorled spikes, the blooms can be pink, purple, rose, yellow, or white.

These are considered excellent bee plants, yielding a hundred pounds or more of honey per colony each year. The crop is white, very light amber, or light yellow. With a thick body, this has a mild flavor with fine-grained granulation. The aroma can be heavy.

Thyme, woundwort, and other members of the mint family are well-liked by bees. These offer a rich array of nectar and pollen throughout the Summer and early Fall months. BC

Connie Krochmal is an award winning garden writer and a beekeeper in Black Mountain, NC.

An Extreme Hive Makeover

Remodeling A Hive From The Bottom Board Up

James E Tew

The patient.

The hive

I always intended to burn the old beehive equipment that was in the brush at the back of my property, but alas, I intend to do many things that remain undone. During the spring of 2003, I noticed that a swarm, no doubt from one of the two hives I had sitting nearby, had moved into the trashy equipment that I had not yet destroyed. At least the swarm stayed nearby, not hanging in my neighbor's yard as do most of my lost swarms. I intended to get the new swarm out of the old equipment before they became established, but I intend to do many things, so the hive not only became established, but, of course, prospered in that junky equipment.

If it's not broke, why fix it?

I've always had good bee inspectors in my area, but the one I have now is particularly committed to hive inspection and hive health. It was embarrassing for the county bee inspector look at my three colonies and find one was in really, really, bad equipment. Though the bees were content in the unloved equipment, I was essentially shamed into upgrading the equipment to beekeeper standards – not honey bee standards. This past Spring, I undertook an *extreme hive makeover* of this unit for no other reason than the sake of my beekeeping vanity.

The situation

The swarm established their colony operation in a single rotted deep hive body with a failed bottom board and a failing outer cover. As the colony grew, with a lick and a promise, I added somewhat better equipment to the unit resulting in the hive equipment being okay in some areas and rotted in others. The equipment was haphazardly positioned near a burn pile, a pile which included scrap lumber, decaying firewood, and Christmas trees from the past two Christmases. Weeds and undergrowth abounded.

The colony had grown to a populous strength and obviously felt that its situation did not need upgrading. It's not that the bees were *aggressive*, but rather that they were *possessive*. The colony was organized, having guards at the many openings and lots of forager flight. Using a combination of cedar wood chips and pine needles, I fired up my smoker, then I put on my veil and removed the full super of honey that the bees made last year. Then, I ripped into the here-to-fore unloved colony.

As it probably is to you, too, I have always been amused by the beekeeper who tucks his/her pant legs into his/her socks to prevent bees from moving up, and inside, when opening a hive. Effective – yes, but stylish – absolutely not! There I was, standing in tall grass, opening a strong colony from the front, with bees flying/crawling all about. In short order I had multiple bees far up both my pant legs. Off to my truck I did go where the perfunctory roll of duct tape was called into action to restrict bee movement. My point? Busting open a strong colony that is in tall grass requires protective equipment preparation even if it is not stylish. Close off your pant legs.

The uppermost deep was full of both honey and brood. This equipment had been added later and was not in terrible shape. The center frames were filled with honey, new pollen and a full brood pattern showing no signs of pests. In short, this part of the hive looked great. I would have thought it would have needed me more.

The bottom deeps

The real reason for the hive makeover was the bottom two deeps and the bottom board. Problems abounded. From a bee inspector's perspective, this was really bad equipment. Wax moths had destroyed the comb back to the plastic foundation and mice had taken over the abandoned space. Then there were the ants. This hive, at one time or another, seemed to have had something for everyone.

For those of you not yet having charged into this area of hive rejuvenation, the value of comb foundation readily becomes apparent. Bees do not build full combs within the confines of the wood frame, but rather they ***mostly*** build the comb within the frame.

The deep had frames that had slipped *into* the hive body, thus wedging them in snuggly, and then, they had been glued in place with propolis. The other side of the equipment was moth damaged, had rotted frames and had the remnants of a mouse nest. My hive tool was nearly useless.

Continued on Next Page

A deep hive body with problems.

Though I have never seen it recommended, at times like this, a common claw hammer makes an excellent hive tool. The wood walls are soft and rotten while the frames are wedged in place. To fix this I set the box on end and hit the bottoms of the frame end bars with the hammer, driving the stuck frame out enough to grasp it with my hive tool. This pounding does not upset the bees any more than fumbling around trying to pull stuck frames from the equipment. In fact, I use this "hammer as a hive tool" fairly often in normal equipment. I don't pull top bars from end bars with this no-nonsense hive tool.

Evaluating frames

When to keep a frame? When to toss a frame? It is your call, but if the frame has a considerable amount of capped worker brood, the bees have a lot of investment in it already. Would it be possible to put it off toward the side to see if the bees will stop using it for brood after it emerges? If the comb is badly misshapen, I cut my losses and get rid of it now. A personal problem that I have is that nearly any frame can be repaired and reused, but the perpetual question that I must face is will I ever find time to repair it? Probably not.

When combs are totally destroyed by wax moths, bees will completely rebuild comb and they will rebuild it their way. By the time enough nectar is coming into the hive, no doubt all the other combs are full. Drone combs are frequently constructed at this point. In years gone by, drones were maligned, being destroyed on all occasions by anti-drone zealots. The comment, and I frequently made it, was that drones do little for the good of the colony. But times have changed and now increasingly, drones are in short supply. Even so, the comb in the photo to too distorted to fit with the frame space.

New hive bodies are set nearby and selected frames are moved to it. Frames that are not discarded should be put – so much as possible – in the same order that they were in within the old hive body.

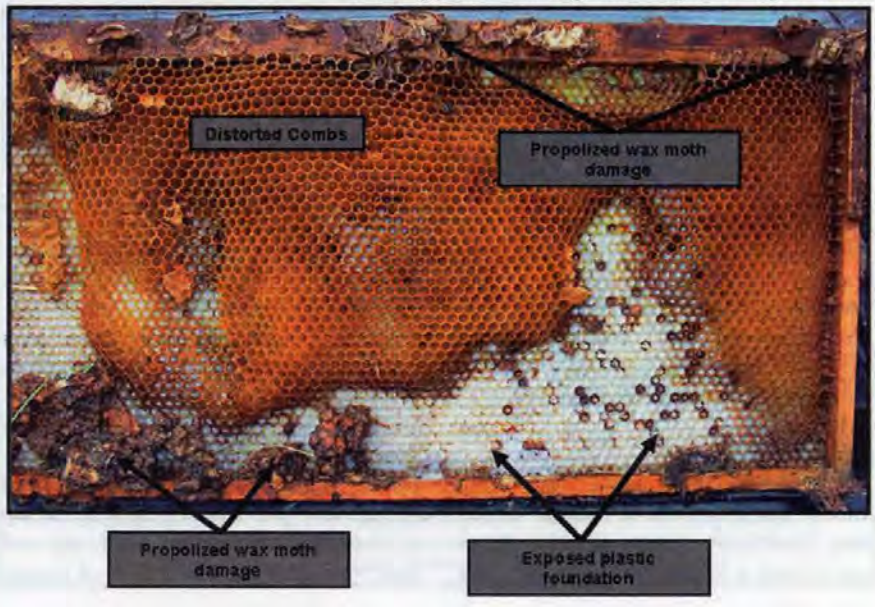
Bees use propolis extensively as is shown in the photo. No doubt, this natural caulking material squeezes a bit more use time out of the equipment than would be expected.

Bees are everywhere

Now, picture this. I have equipment scattered everywhere. Honey is leaking from ruptured cells and bees are crawling and flying all about the area. I scrape burr combs from the tops of the frames and then invariably I step in it. My smoker needs stoking and sweat is getting in my eyes. I have had the hive opened for about 45 minutes and I keep losing my hive tool in the tall grass. Yet miraculously after taking out the last frame to be transferred, there is the queen on the side wall. It's ironic. If I were to go searching for that queen right now, I would not be able to find her Yet in all that confusion, she turns up. I move her to the new equipment and watch her move down onto the combs. At least that part went right.

A way around some of the plastic frame flex problem is to use the

A messy frame needing either repair or replacement.



This was clearly a strong colony that was being remarkably tolerant of my intrusion. Burr comb, drone comb and brood, and propolis matted the top of the equipment. As I scraped off the tops of two frames in the uppermost deep, I realized that I was killing meaningful numbers of bees and for what purpose? I had no real reason to remove all the frames and the bees were going to put the burr comb right back in place. My point? If it is a strong hive that you don't open often, don't fret over the presence of burr comb and drone comb. Leave it. In fact, we need more drones now. If no reason exists to remove all frames, why do it? It only disturbs the bees more.

It has been my observation that when soundly glued in place, wood frames withstand the stresses of banging and prying somewhat better than plastic frames. Plastic frames flex easily allowing the common hive tool to slip off the stuck frame. However, putting significant amounts of pressure on wood frames can separate the top bar from the end bar. So, it's a tradeoff. This difficulty is my reason for developing the hammer method that I discussed in an earlier aside.

Drone comb produced without foundation.

Maxant style hive tool. In my opinion, this tool seems to perform better with plastic frames than the traditional hive tool.

The hook on the Maxant tool is used to pry the frame up using the neighboring frame as a fulcrum.

Rotted equipment.

Reassembly and clean up

After finally getting to the bottom board and replacing it, I began the process of putting the hive back together I put the most brood on the bottom, stacking the two other deeps on top. Finally, the full super went back on top capped off with a new inner cover and a plastic hive top from the Kelley Company I needed smoke to keep bees out of the way so much as possible. I took my string trimmer, another invaluable hive tool, and trimmed the grass around the hive. Within an hour, it looked all neat and tidy.

Maxant hive tool compared to a standard hive tool.

The correct placement of the hook on the Maxant hive tool.

Before **After**

But you should know

I put this colony through this procedure because I felt a need to. The bees had earlier chosen a much more derelict hive body and had done a presentable job of making it livable by bee standards. They have stored plenty of food, are disease and pest free (so much as possible), have a good queen heading the colony and they have a good brood population. They didn't ask me to improve the quality of their domicile, but as is so often the case in keeping bees, it was just something I felt a need to do. BC

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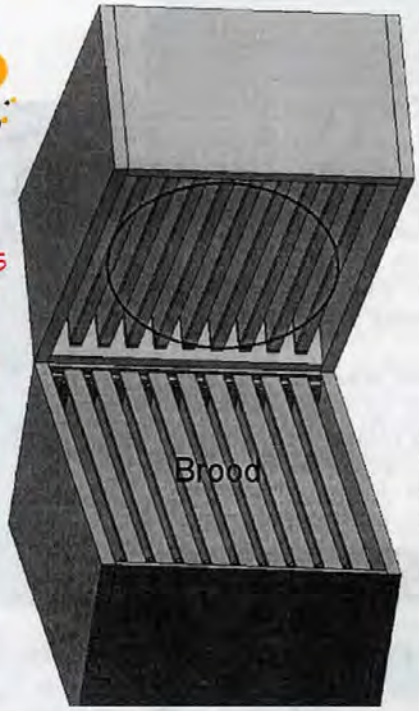
Swarm or Supercedure Cells?

Walt Wright

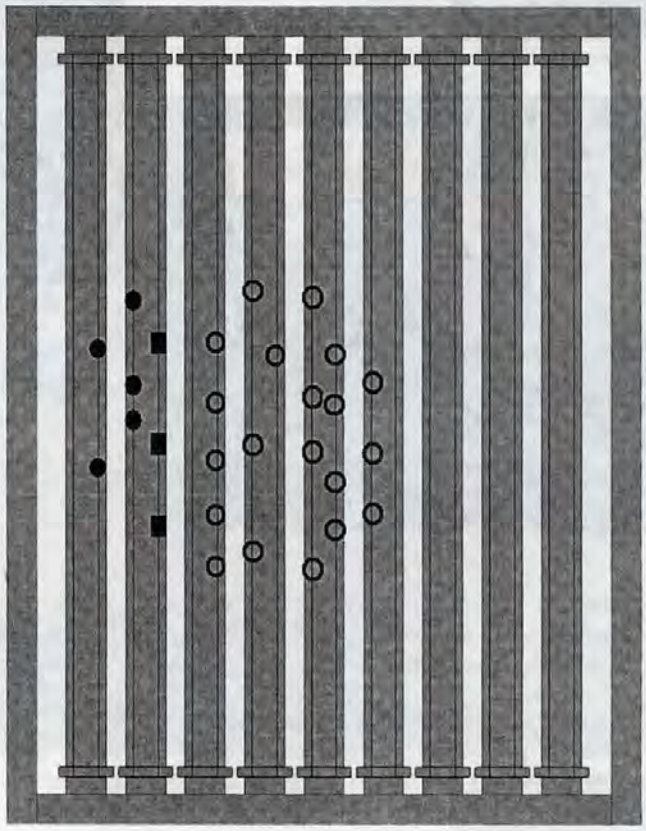
"The experts have grappled with trying to describe the difference between swarm and supersecure cells. That's a tough assignment. There is no difference in appearance of the individual cells with good reason."

"The literature states that supersecure cells are located in the 'center' of the brood nest That statement is not supported by observation."



Upper Deep Tilted Up for Inspection

Basic Brood Nest (9 Frame)



- Original Insurance Cups
- Contemplating Swarm (Either Way Cups)
- Back Up Swarm Cells

The literature is weak on guidelines for determination of supersedure versus swarm cells. This article will describe some observations that will help. Genetic diversity in colonies is reported to be a survival advantage, but genetic diversity means that all colonies do almost nothing exactly alike. The best we can do is describe how most colonies implement supersedure. That's more than you will get from the popular reference literature. In the way of introduction to the subject, it should be noted that swarming is the colony's preferred means of requeening on a regular basis. Supersedure is a backup process that is not as well controlled. We see supersedure as a weak link in the overall survival format. The details will be provided as we slog through the following descriptions.

Most colonies have no queen-rearing (QR) structures (cells) over the winter Any remaining in the Fall are torn down and the wax stored in and around the brood nest. They have uses for old wax in the late Winter brood rearing for build-up. Two of those uses are building drone cells and QR structures. If the QR structures were left over Winter they might be poorly located during build up.

The first of those QR structures are generated for supersedure. The overwintered queen has been inactive for some time, and she is going to be called on to lay at an increasing rate through build-up. Should she falter, structures are prepared in advance for rearing a replacement. In this discussion those early structures will be called *insurance*

cups. I would prefer to call them bases, but was chastised by a well-known expert for making a distinction between bases and cups. He contended that QR structures are either "cups" or cells. It made no difference to him that a cup normally has sidewalls. In compromise, those bases will be called insurance cups in the following discussion.

Before we get into a description of structures we should describe the supersedure process. When you understand the process, you will have a better appreciation for the location of the structures.

The colony that decides their queen is not up to the task at hand starts supersedure promptly. After starting supersedure cells the old queen is expendable. The colony is not going to let her interfere in the process. If the old queen insists on removing the competition, and balling her away from the supersedure cell in development does not provide adequate attitude adjustment, they are forced to terminate her. They would prefer to have her continue to lay until her daughter is mated and laying. The literature calls that an efficient supersedure, but those are rare. There is almost always a brood break caused by supersedure. If the old queen doesn't get uncontrollable until her replacement matures to the point of making noises in the cell, the brood break may be short. But often the brood break stretches for nearly a full month. It doesn't seem like the old queen should recognize a larval replacement as a threat to her status, but she is often terminated very early in the process.

If the brood break is relatively short, the slow down in population growth is not noticeable. The replacement queen lays at a faster rate – playing catch up. In the longer brood break, with an empty brood nest, she really gets in a hurry. Sometimes she doesn't take time to stand the egg neatly on end at the bottom of the worker cell. Eggs are every which way at the cell bottoms.

The literature states that supersedure cells are located in the "center" of the brood nest. That statement is not supported by observation. Although it can happen, that is not the norm. The bees have been at this survival business for a very long time. To avoid terminating the existing queen early, insurance cups are normally located outside the queen's traveled area. The insurance cups, and supersedure cells if required, are located in the fringe areas of the brood nest. One of their favorite places is above the feed pollen frame at the outside of the brood nest. Of necessity, the feed pollen frame is in the warmed cluster area, but the queen does not travel there in her egg laying rounds. We have also found them above the brood nest on a nectar storage super. That may be six inches or more from the brood nest, but is within the warmed cluster volume.

It's location, location, location. But not where you were taught to look.

Insurance cups in a Langstroth hive are normally built on the bottom bars of frames. As the cluster expands into the next higher box insurance cups are constructed on a brood nest fringe frame. There may be as many as six in a short row about the center of the frame. Warmth is controlled by the shape of the expansion dome and may not extend to frame ends. Three or four is normal early, but they may add a few more as the cluster envelops the whole frame. When an insurance cup is added on the face of the comb, a standoff is used to suspend the queen cell between combs. In the wild brood nest where comb is continuous from top to bottom, some rather ornate standoffs can be found. We have seen them arched like the mounting for a city streetlight.

The insurance cup juts out from the bottom bar to permit building a queen cell below. The end of the structure above the open space has a downward facing, dished-out surface to start a chamber for the larger queen larvae. If not used for queen rearing, it can stay like that until it turns quite dark in color When built, the cell face was lighter color than the old wax used for capping brood. That implies some new wax was mixed in.

When the colony is contemplating rearing a queen on the insurance cup, sidewalls are started. The sidewalls flare out to make the chamber for the queen larva. (Now, it is a real cup.) When the chamber necks back down to cell dimensions to form a goblet appearance it is likely populated with egg or larva. This development is not necessarily continuous. The colony reacts to conditions as the season unfolds – both in the colony and in the field. Field forage and the demand for queen egg production both oscillate during the early season. The colony consensus is finely tuned to these variations, and their inclination to start or work at queen cells oscillates accordingly. Supersedure is the colony's first line of defense when things are not going well. If they have problems they don't understand, they tend to blame it on Mama. If the problem resolves itself, as in the case of field forage availability after a dearth, the colony can suspend any supersedure work in progress.

The experts have grappled with trying to describe the difference between swarm and supersedure cells. That's a tough assignment. There is no difference in appearance of the individual cells – with good reason. Either the primary swarm cells or supersedure cells are built on the early insurance cups. Although the cells themselves look the same, there are differences in patterns of cells and development ages of the replacement queens.

The sketch is intended to show variations in patterns for recognition of supersedure cells. In the introduction of this article it was noted that supersedure appears to be the weak link in survival traits. This assessment is based on the lack of backups generated in the supersedure process. When supersedure is endorsed, essentially all the insurance cups available are populated as a group. There may be only a week spread between the first and last. In contrast, there may be two weeks age difference for the swarm cells.

The emergence of supersedure

Continued on Next Page

Tip Of The Month

Filling the basic brood nest with nectar is a sure sign of hopelessly queenless. If the colony has a replacement queen in work, they will hold the brood nest open for the replacement. They may spot some pollen and nectar, here and there, but the brood nest is basically empty. When you find a colony with no brood, filling the brood nest with nectar, don't waste your time looking for a queen. Order one.

queens essentially as a group and the ensuing competition among them leaves just one to ascend the throne. Mating is risky business considering the distances flown and that purple martins are feeding on the drone congregation areas in the early season. The high success rate of supersedure is a credit to the moxie of the virgin queen. My records indicate that supersedure is successful about 95% of the time in this area.

Back to the sketch: The indications of supersedure are queen cells of nearly the same stage of development, located at the fringe area of the brood nest. Swarm cells have backups into the interior of the brood nest. As noted earlier, the primary swarm cells are also built on the insurance cups. The interior of the brood nest can be peppered with those back up cells. Twenty or more is not uncommon. Those backup cells are not as well cared for as the early cells and can be just nubbins by comparison. But they will produce at least a temporary queen to tide them over. A swarmed parent colony is not likely to go queenless as a result of swarming.

And then there is the middle ground between swarm and supersedure. Here, we have to debunk another literature misrepresentation. You can find literature references to a swarm being used to rid the colony of a failing queen. The species has a lot riding on successful reproduction. To suggest that they would commit a swarm to certain failure is akin to you telling your kid to "go play in traffic." In actual fact, the colony is very careful to insure that the old queen is able to handle the duties associated with establishment of the swarm in a new location. If the consensus decides she is not able to hack it, they will opt to supersede well into swarm preps. A cornerstone in the honey bee's survival format is that they do not waste resources.

For the sake of discussion, let's examine a colony on its way to swarming that decides its queen is not capable of heading a swarm. They have not populated the primary swarm cells yet, but have started adding cups toward the brood nest interior. They opt to supersede. Now, in addition to the nominal five or six insurance cups, there are a few backup cups. Let's say four more. They have a total of 10 cups available to start supersedure. They may use them all for supersedure. This makes for a very difficult call for the beekeeper. If you have absorbed the criteria above, you might make the right judgment.

In the sketch ● represents the original insurance cups, prepared well in advance of a need that will be used either for supersedure or the primary swarm cells. ○ represents backup swarm cells that will be distributed randomly in the interior of the brood nest. They are often built at the time the colony commits to swarm by populating the primary cells, and some can be added even later. In between, ■ are the either way cells. They add a confusion factor to interpretation of colony intent. If all cells in work are at approximately the same stage of development and in a tight pattern, think supersedure. If the colony is still adding cells trailing in development and into the brood nest interior, think swarm. We hope this article has been some help in your interpretation of what you see.

Did you notice how many features of insurance cup construction reflect advance planning on the part of the colony? There were four. The first three: Built before needed, located over space for the queen cell, and dished underside for queen larva chamber are less important. The fourth you should remember. Has to do with *where*. BC

Walt Wright is a retired engineer and a hobby beekeeper in Tennessee.

TRY THIS
TOP TRAP

Charles Simon

This year I've enjoyed a higher incidence of bees surviving the winter – not just surviving but thriving – than in any of the past 12 years, since *Varroa* came to my area. Most of my bottomless hives are doing great. Those that haven't made it, didn't for reasons other than parasitic. Most of my conventionally bottomed hives perished from parasites.

There are no *Varroa* in any of my hives now, no tracheal mites, hive beetles, foulbrood, sacbrood, nosema, or any other bad thing.

I am not gloating. I have paid plenty of dues, 12 years of either losing every single bee every Winter or nearly every bee, and no doubt will pay more before my time is up. I went from a good and growing honey business to no business at all. You might think, well, he's just a little guy, 20 or 30 hives, so he has the luxury of losing everything every year But I make my living with bees (and wasps). And my living is just as important to me as the 40,000 hive beekeeper's is to them. I don't have the luxury either. Besides, it's not a luxury. It's a fact of life. To survive you've got to adapt. That means making changes. I'm sure you've noticed: "Better living through chemicals" hasn't exactly panned out. It's time to wake up, my fellow beekeepers, and smell the blossoms!

I'm grateful for the *Varroa*, because it has taught the bees survival skills. Now it is important not to subvert those hard-won skills with inappropriate management techniques just because they're traditional/ritual. Take a good look at what's really going on and manage your bees according to that, not according to the book.

Screens in, IBB set for top trapping.

Here it is – set up and fully functioning, trap on top in trapping mode and yielding nice pollen daily, bees entering nicely at top, exiting nicely through wire cone escapes on front of trap sliding face – IBB on bottom in two-screen mode. Duct tape to cover cracks. Notice crack at top of lower screen with a bee looking into it, but they didn't start squeezing in – I did however shim it upward.

I developed bottomless beekeeping as a means for coping with *Varroa*, but going bottomless is not just about *Varroa*. Debris on bottom boards is a more significant detriment to the health of the hive than it's generally given credit for. How many conventional beekeepers really make sure their bottom boards stay clean and dry? How many actually tilt their hives forward? Debris holds moisture, the bottom board holds heat, and the combination makes for an ideal environment in which all kinds of noxious organisms can proliferate. In honey bee health, the same as in human health, what you see, when you finally see it, is only the tip of the iceberg. There is never just one thing wrong. It is always a complex with tentacles and roots extending throughout the organism in both space and time.

The negative effect of debris and moisture would be reduced in certain feral settings, in a hollow tree for example, where the bottom would not be a straight board directly below the bottom of the combs, or in a wall when the joist below the colony bottom is a long way down. I am very interested in feral bees (feral anything for that matter), and when I hear a report about

how they're doing, I always take it with a grain of salt because I know they are not taking into consideration the actual configurations of the settings.

One thing is certain: There is no debris in bottomless hives. You can take that to the bank. I do.

The bottomless hive is a compromise between a cavity and an open space. The hive structure without a bottom board contains the colony nicely, although if not managed properly, they will build combs right out the bottom. And heat rises, so there is that to help the bees keep their cluster space warm. And there is the significant benefit of no moisture buildup. I have found that the damp that comes with the rainy season is not a problem at all as long as it is not contained and incubated. When contained and incubated, it is a serious problem.

One of the strongest objections to going bottomless, in my mind, was that the bees wouldn't be able to propolize their entrance. Seeing the hive entrance in my mind's eye as a narrowing structure was a mental block, a habit of thinking preventing me from realizing the possibilities.

A turning point for me was the observation of a certain feral hive over a several-year period. A few of us local bee guys were keeping an eye on it. It was hanging from a limb of an avocado tree completely out in the open. One of the guys fixed a small piece of canvass over top of it, barely enough to give it some protection from a straight down rain. Eventually somebody knocked it down, but until then that colony was very successful. That they would build out in the open like that and do so well for so many years gave me insight into honey bee adaptability, which helped open my mind to the bottomless possibility, which now, into its third year, is proving to be more than a possibility.

Bottomless beekeeping (in combination with foundationless – and a few other tricks) is working great for me in my climate here in the Monterey Bay area of California. And I am sure it will work in any climate with proper manipulation, like putting on bottom boards for Winter, or, better yet, using my latest invention (official date of conception: January 1, 2005): the IBB, Integrated Bottomless Bottom, the Swiss Army Knife of apiculture.

I initially started thinking about it because I wanted to run my pollen traps on top instead of on the bottom of my hives, and to do that would require some sort of closed bottom. Simply using a conventional bottom board and closing the entrance wouldn't be good enough – that debris/Varroa thing again. So a bottomless bottom was a logical next step. The IBB is essentially a shallow super that goes on the bottom with two slots that accept screens and boards, one slot near the top of the box, one near the bottom. The screens and board are reversible. One side gives bees access, the other side has no bee access. Bee access is optional with screen or board in the upper slot. There is never bee access in the lower slot. The IBB supports eight modes of operation: 1)A screen in the upper slot with no bee access and a board in the lower slot with no bee access; 2)a screen with bee access in the upper slot and a board with no bee access in the lower slot; 3)a screen with no bee access in the upper slot and an empty lower slot; 4)a screen with no bee access in the upper slot and a screen in the lower slot; 5)a screen with bee access in the upper slot and a board in the lower slot (this mode is virtually the same as a conventional screened bottom board); 6) a screen with bee access in the upper slot and an empty lower slot; 7) a board in the upper slot with bee access (for full on cold); 8) full bottomless with both slots empty.

One-day harvest from top pollen trap.

Pollen trapping is important to me, because bee pollen is the best food on earth for humans. Pollen trapping, when done right, is good for the bees, healthy for the hive (the stripping mesh in the trap does knock off *Varroa*), and it cuts down on that yucky honey problem. Personally, I want less honey. It just gets in the way and makes a mess.

But the traditional placement of pollen traps underneath hives creates problems. They collect debris and parasites and have to be removed to be cleaned.

The real solution is positioning a pollen trap on the top of the hive. That way there is no debris at all, ever, and no screen needed above the debris board, and they're easy to install and remove.

When a bottom trap has to be removed for cleaning you first have to remove the entire hive. This is a pain if you've got two or three full deeps and three or four honey supers on top of that, and you're getting old and your back is getting worse. But it is a pain that can be cured completely by simply positioning the pollen trap on top of the hive.

I have heard of top pollen traps but haven't been able to find any. Those little ones that hang on the outside of the hive could be operated at the top but are too anemic to bother with.

The good news is bottom pollen traps work just as well on top, with a little modification. The bees go through the same screens only in reverse direction in order to get down to, instead of up to, their combs, and they do it no problem.

Modifications: ½ x 1 inch wood strips fixed to the bottoms of the traps, around two sides and the back, to allow the sliding gate to alternate between free-flight and trapping mode as in normal bottom-of-hive operation. There is no problem in free-flight mode with the gate in the up position, because the bees have immediate access to the tops of their combs. But something

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"If you've tried bottomless beekeeping, you'd love a top trap."

might be done to let the bees out when the device is in trapping mode with the gate in the down position. I say "might" because the bees can be allowed to exit right back through the screens. It is even easier for them getting out than getting in because they are thinner going out. But I hadn't thought this through before I set up the first trap on top. So I did give them escapes.

I put four 3/4 inch holes across the front of the bottom half of the sliding gate and placed four conical bee escapes onto the gate, then cut out two sections of the board behind the gate that it slides against. Also, the regular conical escapes that come inside the trap had to be plugged, because in trapping mode, the bees would use them to bypass the stripping screens and get to their combs faster. I took those escapes out and glued a strip of wood across the holes. But leaving the escapes in place and dropping something like little balls of duct tape into them would be even better.

It would be better to not have to physically alter the trap at all – these traps are expensive – in case you wanted to go back to conventional bottom use, though. I don't know why you'd want to do that. Conical bee escapes could be positioned along the front of the top super, or any super for that matter, but closer to the top would make more sense, the trap being at the top making it a smoother operation keeping the bees oriented toward the top. And two escapes would probably be enough.

The traps I use have ten internal conical bee escapes. The logic behind so many is that, since they are on the inside and can't be readily inspected, and since the trap is on the bottom and can't be readily opened for inspection, and since they can plug up easily, many escapes are needed so if some do plug up, others will remain open. But with the escapes on the outside, either along the bottom of the sliding gate on the trap or the front of the top super, any obstruction would be noticed and cleared quickly, so two should be enough.

Top pollen traps can be left in place all year long. They would be very unlikely to accumulate debris. And the trap on top, not functioning, would provide 4 or 4 ½ inches of dead air insulation.

But there is a potential problem: top trap entrances and exits would let out warm air. This would not be a problem during hot weather, of course. It would even be an advantage in improved circulation. But in cold weather, the holes will need to be plugged and the trap slot will need to be closed with a piece of wood. With a conventional bottom or an IBB with board in place, one hole might be left open for circulation to let out moisture.

I conceived the IBB, Integrated Bottomless Bottom, in order to make top pollen trapping possible while maintaining some kind of bottomless advantage. Although it looks to be an important device whether trapping or not, in that it allows for quick and easy adjustments to changing climate conditions, providing positive elimination of debris and parasites in all modes except the board with bee access in the top slot mode (virtually the same as a conventional bottom board). I will most likely never use it that way myself, but I have designed in the option just in case. Beekeepers in cold climates might want to use it that way, although even then I think a screen with bee access in the top slot and the board in the bottom slot would be the right ticket.

When the pollen trap is trapping and the bees are entering at the top, the Bottomless Bottom will be in screen top slot without bee access/board bottom slot mode, or, better yet, two-screen mode. With the board in the bottom slot and the screen in the top slot, the board could be fitted with sticky paper, just like with a regular screened bottom board. But if what I've read scientists say is true – that when the *Varroa* falls it remains stationary where it lands until or unless a bee passes by or it dies – that won't be necessary, unless you're into parasite counting.

When the top pollen trap is in free flight mode, the board bottom can be removed from the IBB, keeping the sealed screen in place. Before entering this mode, the bees would have to be well-oriented to going in and out at the top, otherwise they will keep trying to get in at the bottom and waste a lot of energy. When bees trying to get in at the bottom contact bees on the inside through the screen, they are likely to transfer nectar through the screen and develop the undesirable habit of returning to the bottom when we want them coming and going at the top. The remedy for this is two screens with no bee access, one in the upper slot, one in the bottom slot.

Since I hadn't finished building any IBBs by the time I put on the first top pollen trap, I solved this problem quick and dirty by tacking a 1/8 inch screen on top of a shallow super and another on the bottom and using that at the bottom of the hive.

The more I think about it, the more I think it would always be advisable to use two screens instead of the one-screen option, to prevent bee communication through the screen, which could start up any time even with the bees well used to coming and going at the top.

When the top pollen trap is not in use or removed – although with this system it should never have to be removed, but you never know, so it's best to design as many options into the plan as possible, certainly to not eliminate any that don't need to be eliminated – that's what makes it a Swiss Army Knife (And what user has ever used all the options built into a Swiss Army Knife?) – the bottom can be opened completely, allowing free access just like in any standard bottomless setup.

I can't believe I just said "any standard bottomless setup!"

With an Integrated Bottomless Bottom on the bottom, a pollen trap on the top, the hive manipulated correctly in between, and the Grace of God, all your problems will be solved! BC

Charles Simon is a sideline beekeeper, inventor and swarm and wasp remover living in Soquel, California. He is a frequent contributor to these pages.

DYING ON THE EDGE OF TOWN

Ann Harman

The ads in the gardening magazines and the scenes on television show the green expanse of a perfect lawn, the riot of colors in the flower bed and the huge size of bright red tomatoes. All this can be yours with an array of insecticides, fungicides, herbicides and incidentally some fertilizer and a little bit of effort on your part.

In our urban and suburban world of today if it creeps, crawls and flies around it is obviously bad. If the leaves have holes, look pale and curly and the lawn has brown spots those, too, are obviously bad. We are taught that dandelions and clover are some of the lawn's worst weeds. Lawns are made of only certain kinds of grass – anything else is not permitted. Fortunately for the industry of pesticides and fertilizers we can have quite an arsenal to fight whatever Mother Nature can deliver

The minute the calendar says Spring – the month depends on where you live – your local hardware store, all the Big Box stores, the home improvement megastores, and even the supermarkets start displaying their seeds and vegetable and flower plants. The shelves within are filled with everything you need to destroy real or imaginary invaders, both plant and animal. Fill up your shopping cart – if you don't need it now, you'll need it soon.

To help out the urban and suburban gardeners the lawn services offer everything for your lawn so that all you need to do is admire it. Subscribers to lawn services in a large metropolitan area were asked to indicate their satisfaction with their lawn care service – 95% responded that they were completely satisfied. One comment was from a happy homeowner – he pays only $11.00 a month and the lawn service comes to spray once a month. Spray for what? The homeowner probably has no idea and does not care as long as the lawn is a perfect carpet of green. In the meantime, in his back yard, the vegetable garden grows but some crops do not seem to be productive. No link with honey bees, or even other pollinating bees, enters the mind.

The lawn services are coming under scrutiny, particularly in Canada. There, laws have already been passed to ban or limit lawn pesticides in the province of Quebec, plus 70 cities and towns including Toronto, Vancouver and Halifax. Such controls will not be so simple to enact in the U.S. since states have the responsibility for pesticide regulation.

Pesticides include the following: herbicides, insecticides, fungicides and a number of minor-use compounds. As far as what honey bees will encounter we can consider the herbicides, insecticides and fungicides. Normally we worry about the insecticides, figuring that weed-killers and fungicides do not affect honey bees. However some Mississippi researchers are looking into effects on honey bees of the fungicide now being used to combat soybean rust. Some other fungicide research has been done but it seems to be low on the list of things to investigate.

A Canadian researcher is looking into the effects of sub-lethal doses of a popular insecticide on bumble bee larvae. Although the larvae are not killed, the insecticide does affect the life of the bumble bee. Can this insecticide also affect honey bees? Why not – bumble bees are our honey bee's closest relative. Bumble bees are not the only wild bees in our environment. We do not know the effects of sub-lethal doses of insecticides on those.

Pesticides are big business, not only here but also around the world. However, it is interesting to note that the volume of herbicides used far exceeds the insecticides and fungicides both here in the U. S. and around the world. World pesticide use exceeds six billion pounds. At the turn of the century the U.S. was using more than 1.2 billion pounds of pesticides. Now just how is this pesticide use distributed?

By far the biggest chunk of pesticide use is in the water purification systems around the country Slightly more than half the pesticides sold are used to clean and protect our water supply. Wood preservative use is about equal to that of other pesticides. Specialty pesticides – those for lawns and for indoor pests – is a $2.5 billion per year industry here in the U.S. You can appreciate that amount the next time you walk down the aisles of stores selling pesticides for home use.

If we consider pesticide use, other than for water or wood preservatives, the agricultural sector is by far the biggest user Home and garden is only a small percentage. But that does not mean the environmental impact of home and garden use is small. On that aspect it is very hard to find any concrete data.

The EPA (Environmental Protection Agency) historically has considered any danger of pesticides to humans involved cancer. However, some evidence seems to show that estrogenic changes may be just as important a concern with some pesticides in use today.

An interesting set of information on insecticides can be found on the Internet at http://ipmworld.umn.edu/chapters/ware.htm. Here you can find the classification of insecticides, historical use, dangers, present-day use of insecticides and mention of those no longer permitted. Included in some of the insecticide descriptions is information about the persistence of that particular chemical on plant parts and in soil. That piece of information can be valuable to beekeepers. It is interesting to note that the information given lists the harmful insects that will be targeted by the insecticide but does not mention effects on beneficial insects, including honey bees.

An important question for those purchasers of pesticides: did you read the label? Not the colorful one on front of the container that shows a nasty insect belly-up, but the "label" is the one on the back that gives the use of the product, any hazards connected with its use and specific directions for its use. One survey showed that about half of homeowners admit they do not read or follow those label directions. Often more than the recommended amount is used.

What about pest resistance to all these pesticides? Resistance to many of the pesticides (remember that includes insecticides and miticides) has been demonstrated in some cases. The effect has been that new and different chemicals have been and are being developed to combat the particular pest. As each new pesticide comes on the market, one side, the industry side, is promoting the product while the other side, the sustainable growers or organic growers raise their concerns.

One can see the mild form of warfare today on the Internet. The industry promotes their products, even through large outlets such as Home Depot. Those who favor a sustainable or organic approach promote their products and methods. As you call up the word "pesticides" you are met with both sides. The sustainable and organic approaches seem to be increasing in number. While I was searching for something on the National Wildlife Federation site (nwf.org) I came upon their section on having a green, lush lawn without the use of commercial pesticides. One of the large homeowner brand names, Black Flag®, brings up quite an assortment of sites to visit. Obviously you are encouraged to use their range of products. Such a dichotomy can be confusing to consumers but only if they are searching for alternatives.

The U.S. has about 90 million households with yards. Only about five million are using only organic methods for their yards; 31 million are using a combination of organic and chemical methods; 35 million are using only chemical methods of pest and weed control. One assumes the remaining 19 million are not using any control at all. Perhaps the presence of dandelions and clover in the lawn and a few insect bites in the flowers and vegetables are ignored. Honey bees would be welcome there.

Looking at some of the products described on the Internet sites, only a few, very few, listed the active ingredient. Most of them promised quick, effective control of flying insects (honey bees do fly, don't they?) that may interfere with your plants, your picnics, your pool parties. So here we have the grounds treated by the lawn care specialist and the grounds also treated by the latest model of insecticide fogger Perhaps there is a "bug zapper" operating as well. And during the day the homeowner sprayed various flowers and vegetables for the real and imaginary insects. Or perhaps one was used that promised "long-lasting residual control for up to six months." Yes, that appeared on an insecticide – in the advertising.

A perfect world would have all the insect and plants safely in their native homes in their natural environment. But man likes to move things around. We no longer do as much as the Victorians who introduced plant and animals species prolifically and purposely (the starling and the "English sparrow" come to mind). Today we do have to face the inadvertent introductions. Unfortunately the publicity surrounding these introductions sends the urban and suburban homeowner back to the store for more control.

The fire ant, long a pest in the south moved north to an Atlantic Ocean beach in pots of palm trees for tiki bars. The palm trees will not last through a winter but the fire ant will. The ash tree, beautiful and decorative, is threatened by the emerald ash borer Since insecticide control is only 80% efficient, to be certain of removal any infested tree is cut down then chipped or burned. But there will be some who will try to save a tree with insecticides, appropriate or not. A wood borer has arrived on our shores in furniture and some wood from both Italy and China. Some form of control may well be necessary in certain cases of these introductions. But in the case of the fire ant, those who have been living with it for many years simply feel that it is possible to learn to live with it.

Project Evergreen is a trade association composed of pesticide producers, pesticide applicators, garden centers, and mower manufacturers. The thrust of this association is to promote the beauties of the perfect lawn. And so the benefits of pesticides are laid out in advertisements for a myriad of products. The urban and suburban homeowners will continue to buy and apply.

What is left? Nothing. The caterpillar emerges to become a beautiful, harmless night-flying moth. Where is its partner? Probably not present. As a creepy-crawly caterpillar it was annihilated. Where is the bird that just might eat a few harmful insects? Gone to find better pastures. Where is the yellowjacket who would love to carry off some bean beetle larvae for its young? Destroyed. Where are the cucumbers? "That seed was worthless – not a durn cucumber." Was it really the cucumber seed? BC

Ann Harman is not using pesticides in her garden, or her yard in Flint Hill, VA.

before that happens. Count mites. Examine bees. And if you have to treat, treat now.

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Getting bees is getting tougher to do. Airlines are getting picky about what they'll carry anymore. And bees are on their not-anymore list more and more often. So mail delivery is getting harder to do, which is going to move up the cost, since those that do carry bees charge nearly as much for one as for 20, or even 200.

This just started coming across my desk, so I don't know if it's going to go back to business as usual by next spring, or DELIVERY NOT POSSIBLE by next spring. In any event, if you buy, or sell airmail queens, or packages, you might want to find out. And you might want to put together a plan B, just in case.

A queen producer, a good queen producer, who first clued me in to this growing problem briefly went over the discussions she'd had with officials and her frustration with the changing system. When you make a living sending expensive queens to individuals – breeder queens at $500 apiece – you can afford $40 shipping costs (if you can find them). But when you sell $20 production queens, $40 shipping is more than the customer will (probably) bear.

The airlines, strapped for cash and credit, are reluctant to give a deal to beekeepers just because we've had a tough year. And pollination? Imagine how much they care about that little problem!

Can Congress, or the President, or Homeland Security force airlines to carry individual queen bees at reasonable prices? Maybe, if enough pressure is applied – pressure from beekeepers, and especially those who need the bees those queens will produce to pollinate their crops. Maybe.

More likely, queen producers will begin to look at queen delivery like package producers are beginning to. That is, send 50 or 500 queens to a regional distributor who acts as a clearing house. That's the plan B I was referring to.

First, though, apply the pressure. Contact your legislators, and your state and national beekeeping groups and urge them to act, also. But if it were me, I'd be looking for somebody that I could trust, that has the setup, and wantd to do business.

We may be looking at the end of queens on demand from anywhere. We may have to do things differently.

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Insurance. We seem to spend a bit of time on this subject. More than I'd like, but here are some figures to keep in mind.

To defend yourself (with the help of an attorney) against a frivolous lawsuit will cost you right about $1000. That's just to get it thrown out. If it goes to court consider a second mortgage.

Lawsuits in the $15,000 award range are 10 times as common as $150,000 awards. These small, generally non-injurious suits, usually involve property damage – gates left open, fires started with smokers, bee poop damage. I'm told there's even more suits settled that cost less. Way more. Got $5,000 you don't need?

Though not common, when personal injuries are involved, the lawsuits can get into the two-comma range. That's serious money.

And now it's farm market, flea market and fair time, and you, your honey and your customers will be in close contact once again. Not to mention those in charge, who are becoming, if not unable, at least reluctant to be willing to pay for your mistakes. So, insurance is required, or certainly recommended, when mingling with the public.

Cost? You bet it costs. A million dollar general liability policy is in the neighborhood of $1,000 - $1,500/year premium range. Half that coverage is about half that premium. You may find less expensive policies – let me know if you do – but that's the range I was able to find.

I understand some improvement is on the way as the shadow of 2001 eases, but I don't have details yet. In the meantime, good advice is CYA as much as possible – limit your exposure, be very, very careful, and pray for good luck.

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A quick reminder. Our first-ever beekeeping calendar will be out in December, and we're still looking for photos. We need 12, good, beekeeping photos. People, places, bees on flowers, bee yards, an extracting operation, making splits, winter hives...think bees, and send in your photos. Those used get a modest one year free subscription, their photo published, and the photographer credited. Send slides or prints to me here, or send electronic photos, 300 dpi minimum here also, as email or on CD.

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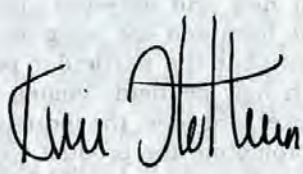
And finally, every couple of years or so I make it a point to take stock in what we are really celebrating the first, long weekend this month. Last year I had the chance to visit with a nephew just returned from Iraq, safe and sound. This year his brother is back from the same part of the world, safe and sound also. But many haven't been so fortunate. And many, many over the years have paid the highest price of admission to the parades and barbeques we enjoy this holiday.

And meanwhile, the old men still debate. And the young men die. This fourth of July, take a moment to reflect. And have a safe, and sane holiday.



JIMSON Weed A Plant To Avoid

David Berlin

It can cause dizziness, delirium, and bad hallucinations – hallucinations so vivid that people who have ingested it have reported LSD-like effects even at low doses. It is a plant whose seeds, fruit, and leaves are extremely poisonous and whose nectar can contaminate your honey It is sometimes consumed as a tea or smoked by teenagers looking for a cheap high, but the high is known to be poor and unenjoyable. British soldiers sent to Jamestown to put down Bacon's Rebellion were secretly drugged with it; it was slipped into their salad. They reportedly spent 11 days chasing feathers, making monkey faces, generally acting like lunatics, and indeed failed at their mission. In the early 1600s, the Virginia colonists, on the brink of starvation, boiled it to make it palatable and tried to eat it. Although the boiling diluted the poison to the point that nobody was recorded as having died, the effect laid the settlers low for days. It's called *Datura stramonium*, better known as Devil's Trumpet or jimson weed or even Jamestown weed, after those long-ago events, and there have been documented cases of Datura-contaminated honey causing intoxication in humans from doctors and hospitals around the world.

Jimson weed comes from the family Solanaceae, the potato or nightshade family Many names have been given to this plant including locoweed, angel's trumpet, thorn apple, mad apple, stink weed, sacred Datura, and green dragon. When asked where in the U.S. jimson weed grows, Dr Paul T Arnold's answer was emphatic:

"Jimson weed grows pretty much everywhere! It is found throughout the U.S. and is widespread. It thrives particularly well in more fertile soils. I have encountered it in abundance in fallow agricultural fields, at roadsides, barn lots, and waste places, but it is a hardy plant that can grow almost everywhere except the Arctic."

Dr Arnold is a Doctor of Botany at Young & Harris College in Northern Georgia; he is also a honey plant expert and instructor at this year's Beekeeping Institute, also held in Georgia. Although Dr Arnold is careful to point out that he has never directly studied jimson weed, he knows something about it from general botanical studies. He's presented information on toxic nectar plants, and he's also familiar with jimson weed "from growing up in the Midwest, where it grew in our fields and in the fence rows at our farm."

Bees tend to visit whatever flowers are in their range. Jimson weed's enormous four-inch flowers with their huge green calyxes are irresistible to honey bees, and they will pollinate it. Although nobody has ever directly studied how much of the plant it takes to contaminate honey, there have been cases of jimson weed contaminated honey causing problems in Poland, Venezuela, and parts of the U.S. The best thing a beekeeper can do with the plant is to get rid of it.

Jimson weed grows to three or four feet tall and has a purplish, smooth stalk. The leaves are generally oval shaped and the lobes do not come in any particular pattern. The flowers are large, purplish, and trumpet-shaped – a bit like a five sided funnel. The fruit of the jimson weed is about two inches long, and is covered with spiny prickles. It starts out green in the early fruiting and ripens to brown. The plant smells terrible, barring the flowers which smell sweet. The flowers open for one evening, but new flowers continue to open throughout the Summer and early Fall. The entire plant is incredibly poisonous, including the black seeds that come from the fruit. The plant flowers and fruits to the point that it sometimes falls over under its own weight.

"Here in Georgia, jimson weed blooms as early as July and as late as September. It will set fruit usually from August to as late as October I think this blooming and fruiting schedule is pretty universal in the U.S. They certainly would be capable of blooming after a cold snap, although I've never seen that here in Georgia."

If jimson weed is on the

Flowers, leaves and buds of Jimson weed.

Continued on Next Page

beekeeper's land, he can destroy it. There's no real ethical reason he can't or shouldn't; far from being an endangered species, it's actually a pest. In NJ and other states it's illegal to plant – it's on a register of noxious weeds in 43 states. In fact, in NJ it is the only plant with a price on its head – if a landowner is cited for having jimson weed on his property and fails to comply with the citation, the sheriff will destroy it and collect from the landowner.

Removing jimson weed is difficult as the plant is so prolific. Dr. Arnold was hesitant to recommend broad-leafed herbicides except in cases where there is a dense stand of the plant. Removal is best accomplished mechanically.

"Fallout from herbicide may affect surrounding 'good' plants. Some broad-leaf herbicides can be applied using direct foliar methods – and I would certainly not generally broadcast the herbicide since you may destroy adjacent plants. If it were me, I would mechanically remove it."

Dr. Arnold goes on to note that jimson weed flowers late in the day and in the evening, when honey bees are usually not foraging. That's why you see few cases of jimson weed honey poisoning.

"The flowering schedule of the plant isn't necessarily perfectly coordinated with honeybee activity."

That said, and although there is no general data available about how many of the 318 cases of tropane poisoning come from contaminated honey, a rough look at the web and at newspapers in research abstracts such as Lexis-Nexis and others shows that it **does** happen.

Tropanes, are the chemicals in jimson weed that cause the ill effects. Tropanes belong to a larger organic chemical class called alkaloids, and tropanes break down into several sub-types. The main tropanes in jimson weed are atropine, hyoscyamine, and scopolamine. Atropine is particularly nasty.

Another good thing a beekeeper can do is to simply scope out the area where he plans to locate the hive and explore looking for stands of Datura plants. An ounce of prevention is worth a pound of cure; properly locating your hives when you originally place them can save you a world of trouble later on. Moving a hive is not an easy thing and honey bees have a range of one to two-and-a-half or three miles – that's a radius, not a diameter – so plan accordingly You could do worse than to take a map, draw out a circle with a compass or a string, and look around. Look for the various types of Datura (generally described the same way as jimson weed, but without the fruit and black seeds).

Jimson weed poisoning is not good for you as a beekeeper; one bout with contaminated honey can have a customer or friend staying away from you and your honey permanently, not to mention potential legal problems. And since the plant grows in all states save one, and it likes warm, temperate climates and a lot of water – which pretty well describes the best habitats for keeping bees, it behooves you to be aware of the problem. Keeping honey pure and uncontaminated benefits all beekeepers and high standards are good for the hobby and good for sales and public perception of beekeeping. BC

? DO YOU KNOW ?

A Potpourri of Questions & Answers

Clarence **Collison**
Mississippi State University

Having just returned from a beekeeping short course in central Mississippi, the topics that were of greatest interest to both beginners and experienced beekeepers were associated with mites, pests and disease control, resistant bee lines, queen rearing and swarm management. While the challenges associated with controlling the parasitic bee mites and keeping swarming to a reasonable level can certainly take some of the enjoyment out of keeping bees, the short course attendees were certainly enthusiastic and eager to learn more about these problems. Another highlight of the course was the large attendance that included numerous new beekeepers.

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

Level 1 Beekeeping

1. Name the three stimuli (conditions) that result in colonies naturally raising queens and which stimulus is most likely to give you the poorest queen? (4 points)
2. When an individual raises queens by grafting young larvae, what are two dangers associated with the grafting technique? (2 points)
3. ____ Honey bee tracheal mites are internal parasites of adult, larval and pupal honey bees. (True or False)
4. On average about ____ percent of *Varroa* mites found with a colony are found within sealed brood cells.
   A. 26
   B. 86
   C. 16
   D. 46
   E. 66
5. ____ Small hive beetles are able to complete a reproductive cycle when they feed on diets of pollen, honey/pollen, honey and bee brood. (True or False)
6. ____ Colonies with screened bottom boards result in an increase in the amount of capped brood, fewer *Varroa* mites on adults and significantly fewer mites in brood cells. (True or False)
7. ____ Coumaphos residues are more likely to be found in beeswax than in honey within the hive. (True or False)
8. ____ The SMR (suppressed mite reproduction) line of honey bees has a genetic trait that causes female *Varroa* mites to increase in infertility. (True or False)
9. Please describe where you expect small hive beetles to lay their eggs within a hive. (1 point)

Advanced Beekeeping

10. ____ Adult small hive beetles feeding on honey are able to live for almost:
    A. 6 months
    B. 1 month
    C. 9 months
    D. 3 months
    E. 5 months
11. ____ *Apis mellifera* honey bees of African origin and their hybrids usually have greater tolerance of *Varroa* mites compared to honey bees of European races. (True or False)
12. ____ On *Apis mellifera, Varroa* mites reproduce on both worker and drone brood whereas, on *Apis cerana, Varroa* reproduces almost exclusively on drone brood. (True or False)
13. ____ As adult honey bees age, bacteria concentrations within the intestinal tract also increase. (True or False)
14. ____ Queen, worker and drone honey bee larvae of similar ages and genotypes are equally susceptible to American foulbrood infection. (True or False)
15. ____ The level of bee resistance to tracheal mites is associated with the bee's grooming behavior (True or False)
16. Hygienic behavior associated with several strains of bees is believed to be associated with ___ sets of genes.
    A. 6
    B. 2
    C. 4
    D. 5
    E. 3
17. ____ When a female *Varroa* mite enters either a worker or drone brood cell, she crawls down the side of the cell and immerses herself in the brood food found under the bee larva. Please explain how the mite survives while it is immersed in the brood food. (1 point)
18. ____ Queens sometimes lay inviable eggs because of a single gene, resulting in a shotgun brood pattern. (True or False)
19. ____ Multiple matings with unrelated drones increases the genetic diversity of a colony's worker population which is considered to be beneficial. (True or False)
20. What is the function of a drone's "hairy plate" associated with its reproductive organs? (1 point)
21. Describe the "cell punching" method that is used in queen rearing. (1 point)
22. Swarming propensities vary widely in different honey bee races and strains. (True or False)

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. Emergency, Swarming and Supersedure
   Emergency stimulus will likely give you the poorest queen.
2. Damaging the young larva while transferring.
   Having the young larva dry out while you are grafting a frame.
   A break in the larva's royal jelly supply since the larva is not moved intact with its food supply.
3. **False** Tracheal mites are internal parasites of only adult honey bees, not associated with either the larval or pupal stages.
4. E) 66
5. **False** Small hive beetles can successfully complete a reproductive cycle when they are fed pollen, honey/pollen and bee brood. However, when fed only a diet of honey they are unsuccessful in producing larvae and completing a reproductive cycle.
6. **True** During the Summer foraging season, colonies with screened bottom boards have more capped brood, fewer *Varroa* mites on adult bees and significantly fewer mites in brood cells.
7. **True** Coumaphos is a lipophilic molecule (fat-loving), therefore, if residues are detected in hive products, they are more likely to be found in beeswax than in honey.
8. **False** Initially the genetic trait SMR (suppressed mite reproduction) was believed to cause *Varroa* mites to have increased infertility or become non-reproductive. Further testing, however, has shown that SMR bees are hygienic and able to remove *Varroa*-infested pupae from capped brood cells. Thus, hygienic behavior is responsible for the SMR lines maintaining significantly lower *Varroa* mite levels.
9. Small hive beetle female adults lay their eggs in the hive by either probing through a brood capping and laying the eggs on or near the larva or they climb into an empty cell next to a capped brood cell and probe through the side to lay their eggs.
10. A) 6 months
11. **True** Africanized honey bees and their hybrids usually show a greater tolerance to *Varroa* mites compared to the European races. Adult *Varroa* females have a higher reproductive success on worker brood of European races compared to Africanized honey bees. Africanized honey bees are also more efficient in identifying and ridding themselves of mites.
12. **True** *Varroa* mites reproduce on the immature stage of its hosts. On *Apis cerana*, reproduction occurs almost exclusively on drone brood. On *Apis mellifera*, the European honey bee, *Varroa* reproduces on both worker and drone brood.
13. **False** The intestines of newly emerged bees are free of bacteria; adult bees between one and 14 days old, which eat a lot of pollen, have many bacteria in their mid-guts, but later, when their diet is mostly honey, the bacteria almost disappear.
14. **False** Larvae of queens are more susceptible to American foulbrood infection than larvae of workers of the same age and genotype, which in turn are more susceptible than larvae of drones.
15. **True** Research has shown that "grooming" by honey bees is related to the level of resistance the bees have to tracheal mite infestations. When grooming, honey bees brush their middle pair of legs over the thorax and dislodge tracheal mites that are in the external or phoretic phase of life. Resistant lines in comparison to non-resistant groomed themselves significantly more often than the non-resistant bees.
16. B) 2
17. Once a *Varroa* mite enters the brood food under a larva it becomes immobilized. While immersed in this liquid environment it erects its peretrimes (aquatic breathing tubes) which allows it to breath and survive.
18. **True** If a queen mates with a single drone that happens to share one of her two sex alleles, then half of her offspring will be diploid drones and they will be cannibalized by nurse bees when they are less than a day old, leaving an empty brood cell that the queen is unlikely to lay in again for some time. Thus, if a queen is mated to a closely related drone or drones, she is very likely to produce a scattered brood pattern.
19. **True** Queens normally mate with 12-15 different drones. With a large pool of drones, these drones will carry different genes for a wide variety of traits. So when a queen produces worker offspring sired by these different males, the workers vary from each other genetically. The result of this increased genetic diversity within a colony is that the workers have different traits, producing a variable and cosmopolitan worker population.
20. The hairy plate is part of the drone's reproductive structures and is used during mating to push the mating sign from the previous drone out of the way so he can deposit his semen.
21. With the cell punch method a selected breeder queen is isolated on a frame of drawn wax foundation. After two to 2.5 days, this frame is used to cell punch eggs, thereby assuring that the youngest possible age larvae will be used for queen-production. The cell punch method provides a way by which the larva is not handled directly at all. With this method an entire worker-sized cell with an egg or appropriate aged larva is removed by cutting or coring it out with a variety of tools. Since the whole cell is removed, the larva is not touched directly in any way and it is removed intact with its food supply uninterrupted. The cell is now mounted on a cell bar similar to the type bar used for mounting artificial queen cell cups in the Doolittle method. The mounted cells are then placed into a queenless unit for cell building.
22. **True** The swarming instinct varies widely in different honey bee races and strains. The

Continued on Page 56

what cost? What other traits would be lost in the process? Are we gonna make mistakes that will have big consequences (think of the importation of the African Honey Bee in Brazil, 1956, trying to improve the productivity of the local bees...) in trying to do so? What new problems or diseases would emerge because of this shift? What will it represent for those producing places? What is this way of thinking about a problem? Is it the "American way" (meaning no offense)?

"Why should we tear down our beautiful forests for timber? Just buy timber from afar When those "offshore" forests will be cut clean, just find timber some place else.

Why should we use our own land to raise our beef cattle, pay big money to buy farming land, pay costly farm workers when we can do it in developing countries, for much less, regardless of the impact in those countries. Why should we bother having troubles with diseases and pests in our honey bees? Just let someone else deal with it. We just have to buy the packages. And if they have too many problems producing these packages because of the stress of the production rate having to be higher and higher, resistant *Varroa*, SHB or whatever, we'll find someone else who can do it."

Sorry, I don't think that would be a very responsible way of dealing with the disease problems. We as a whole are responsible for the *Varroa* infestations, for SHB, for AHB. It happened because we wanted more bees to meet our pollination needs. We moved our bees everywhere. We wanted more honey out of them, too. So we wanted more productive bees. In the process, mites and diseases traveled with the bees and now (almost) everybody has to deal with it. The correct way of dealing with all this is to take our share of the problem, and work on it. Do more research. Learn to know more deeply the Honey Bee. Try to understand what we don't about it. Everybody will benefit from it.

Hugo Tremblay
Jonquiére, Quebec, Canada

Mites & Powered Sugar

There seems to be some confusion on powdered sugar and *Varroa* mite treatment. Some reports are that mites are suffocated or dried up by powdered sugar and other reports state otherwise. Some reports are that larva and sealed brood are affected by the powdered sugar and other reports will state otherwise. I liberally dusted powdered sugar on young larva and sealed brood and observed no bad effect. The powdered sugar was removed by the bees overnight. I do not know the actual hours it took.

These are my observations with my experiments.

The age of the mite must be taken into consideration. A random mite drop on a sticky board only tells us that mites have dropped. If the mites are near the end of their life span and stressed with the application of powdered sugar then they will drop sooner. In a few days they would drop without any treatment. Without treatment many of these mites will be carried out by the bees so will not drop to the sticky board. When treated the mites will drop in larger numbers and many will drop to the sticky board. The more mites in a colony the larger the drop.

I used mites taken from drone cells so they are of the same age. These mites have survived in powdered sugar over night. I failed to note how much longer they lived. Sometimes when mites appear dead they become active after several minutes.

When reported that powdered sugar kills the mites maybe it is only the mites at the end of their life cycle and the powdered sugar stresses them so they die sooner. My observation is that powdered sugar does not kill young mites. It will however cause the mite to loose its hold on the bee and the mite will drop off. Mites will live for several days after they drop.

I am treating colonies using confectionary sugar plain – also with garlic powder – and with Thymol. To begin with I knew confectionary sugar causes mites to drop because it is used instead of an ether roll. In 2002 I observed using a microscope and found cup type extensions on their legs that helped them cling to the bees, some report that it is suction and other report that it is a sticky substance that helps the mite to cling to the bee.

I put mites in confectionary sugar and found out that the sugar DOES NOT suffocate or dry out the mites. The mites survived over night, this was confirmed by experiments from the Univ. of Nebraska. Using a microscope I observed that the mite clings to the sugar particles and will loose hold on the bee causing it to fall off. This was also confirmed by a report from University of Finland by Dr.Kamran Fakhimzadeh. He further added that particle sizes of five to 15 microns would clog up the suction cups. In reality any powder will work providing there are enough particles between five and 15 microns. I measured the particle size of garlic powder and pollen substitute and found out that they both had more small particles than the powdered sugar That is probably the reason garlic powder works better with powdered sugar than powdered sugar alone. We must not forget that garlic powder may have some antibacterial or viral properties that enhances the effect and may also have some synergistic effect. So if garlic powder works for you then keep using it.

I next have to find out if the mites can clear their feet of the particles. If they do then screened bottom boards are needed. I use screened bottom boards. I will check this out.

So far in 2005 (May) I have 19 out of 20 colonies survival rate and most are very strong and I will make nucs and splits. I have not used Apistan for at least four years. One important thing I learned is that we MUST treat the colonies when there is no brood. I try to treat every month even if

the bees are clustered. I use a mizer garden duster and cover the bees until they are white. The duster has a lot of pressure and will go through several hive bodies. I will flip a hive body on its end and dust thoroughly from both ends. It takes two or three minutes to do a colony, which is not bad. If the temperature is low and bees are about to cluster then smoking is not necessary.

We wonder why we are getting mite resistance to fluvanilate and it is because we are treating at the wrong time. We should treat when brood population is at its lowest point and that would be when the bees are getting ready to cluster The mites on the bees would then get the most exposure to the strips and also all the bees would be in contact with the strips. Since we would have very little or no brood then mite reproduction would be at it's lowest point.

Reports out of Germany state that we should treat for mites when there is no brood. For beekeepers that rely on fluvanilate then powdered sugar treatment may be added to fill in the gap. Either way it won't hurt, it is safe to use, doesn't take much time and can be used during the nectar flow.

In order for powdered sugar to work you NEED to completely cover the bees until they are white. You will need a duster with pressure to go through two hive bodies. Flip a hive body on end and dust from each side. Just dusting with a sifter or a sprinkler container will not work unless you want to take the time to remove each frame and dust both sides.

David Mattichak
Port Republic, VA

Bees Besieged

You've read about the problems that bees and beekeepers are having and, if you're an almond grower, you've likely followed these stories closely. A new book, *Bees Besieged* by Bill Mares, gives a highly readable overview of the current status of the U.S. bee industry. Mares, a hobbyist beekeeper from Vermont, a high school teacher and former reporter spent four years touring the U.S. (including a swing through California's almond country) interviewing beekeepers, honey packers and others associated with the industry.

The challenges facing beekeepers are indeed daunting: cheap imported honey, low honey prices, parasitic mites, the constant threat that mite-controlling chemicals will be found in honey, diminishing bee pasture, pesticides, Africanized bees and, with the notable exception of almonds, relatively low pollination fees.

Regarding honey prices, beekeepers ponder the same question bothering farmers: why is the price in the grocery store so much higher than what I received? Mares also examines the symbiotic relationship between almond growers and beekeepers: how the U.S. bee industry has come to depend on almond pollination (and vice versa).

This book is an impressive undertaking, weaving many disparate facts into a coherent whole. It is also immensely readable, even entertaining, with its many on-site interviews with industry players. This book is highly recommended for growers that rent bees for pollination and, because one third of the food we eat is the result of pollination, for the general public as well.

Joe Traynor
Bakersfield, CA

carniolan race has a strong disposition to swarming because of its great vitality and fast development of colonies in the spring. Africanized honey bees in comparison to European honey bees also exhibit excessive swarming tendencies which is a survival tactic in relation to a harsh environment.

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

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

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

Up In Smoke

Peter Sieling

The temperance tradition in my family tree goes back to the early 1800s. You might have found alcohol in our family's medicine chest. Applied to a wound, its sting painfully reminded you of the pain to your posterior should one drop pass your lips. Words like "cigar" or "tobacco" were as bad as the swear words "darn" or "geez." Empty wine bottles and cigarette butts littered the road to Hell.

Still young and reckless at twenty-six, I mortified my mother by marrying a New England Episcopalian. They drink wine right in the church service! They smoke in the church parking lot! The dinner table at my in-law's looks like a frat house the Sunday after a party. If my mother ever saw me there, she'd turn over in her grave, except that she's not dead yet. She vows to outlive my wife to make sure I behave. Whenever I visit, she smells my breath.

Nancy may accept legal beverages, but she detests tobacco. "It's like this, Honey," She told me before the wedding. "I love you with all my heart. But if you take one drag on a cigarette, pipe, or cigar, you are history."

I never did smoke, except once to tweak my mother. My brother came home from the county fair with a cigar he won by hitting the anvil and ringing the bell. We lit up and took a couple puffs behind the barn. Afterward, we breathed in Mother's face and told her, "We've been out behind the barn smoking." She didn't grasp the humor. Andy and I learned that teenage boys weren't too big to spank.

I learned to enjoy the smell of tobacco smoke while visiting the black sheep relatives down the road. Day and night, they sat at the dining room table playing cards and smoking. The bluish air in their house smelled rich and robust. The aroma lingered on your hair and clothes for days. Butts overflowed the ash trays, spilling onto the table cloth and leaving little scorch marks. Thinking about them as I watched Nancy weeding the flower garden one Fall day gave me an idea.

Nancy grows nicotiana, a gangly plant whose flowers perfume the evening air all Summer. It belongs to the Solanaceae family along with deadly nightshade, henbane, and belladonna – plants steeped in medieval superstition and witchcraft. Commonly called flowering tobacco, it is a shorter and smaller leafed variant of its infamous cousin. The blossoms open in the evening for nocturnal pollinators. Bees do not harvest its nectar.

Some beekeepers claim tobacco smoke knocks out mites more effectively than other plant materials. At least it smells better than burning leaves. Would flowering tobacco work and smell like regular tobacco?

I furtively gathered nicotiana leaves and hung them in the barn rafters to dry during the Winter months. On the first warm day in March I retrieved some tobacco and stuffed it into a brown paper bag. I dusted off the smoker and veil, then started toward the beeyard. Nancy was bending over, cleaning old leaves from the flower bed. She looked like one of those plywood lawn ornaments. She glanced up as I passed.

"What are you doing?" she asked. Did I detect a note of suspicion in her voice?

I tried to sound casual. "Oh, I'm just going to check the bees." I hoped she didn't catch my voice squeaking on the last syllable.

"Have a nice time, dear." She always tells her friends, "I know where he is and I know he can't get into too much trouble. The worst he can do is drop a super, trip and fall over it, and get stung to death. And, well, his life insurance is paid up."

In the beeyard, my hands shook as I lit the smoker and added the tobacco leaves. Fragrant puffs of smoke drifted over the apiary. The aroma reminded me of my now deceased relatives. Warm waves of nostalgia wafted over me like delicate wisps of smoke.

After checking the fifth or sixth colony with tobacco smoke, I felt a curious queasiness in the abdominal region. I can work all day in a cloud of smoldering sumac or pine needles. I supposed it must be the tobacco. The sensation grew as I moved down the row of colonies. By the 10th hive, I remembered a story told by my great great great uncle William, the first known temperance man in the family. In his memoirs he described smoking a cigar during his reckless youth. In 1823 he took a steamer down Lake George to visit his mother. Imitating the older, refined travelers strolling around on deck, Will set out to get a cigar for himself:

"Locating the bar as the bee hunter does his prey, by the line of comers and goers, I forthwith appropriated a lighted "long nine," and, thrusting my hands into my pockets, went swaggering about the decks after the style of my superiors, whose manners, when under the brutish nicotian influence, could scarcely be misrepresented by the caricatures of Madam Trollope. Totally unaccustomed to the use of tobacco, its effects were soon apparent in certain qualmish sensations in the region of the epigastrum. I whiffed away most pertinaciously, until no longer able to resist its influences, I leaned over the tafferel of the steamer and "settled my accounts" with such earnestness that I was thrown into convulsions, and my countenance assumed the image of death." The alarmed passengers reported to the captain, "A man dying!" He hastened to the spot, inquiring, "What ails you?"

"Hiccup! Playing, the Gentleman, sir.""

I stuffed the plug into the smoker spout and staggered home, glad to be snatched from the jaws of destruction just in time. There is no tafferel to lean over in the beeyard. I'd have to settle my accounts over the porcelain fountain in the bathroom.

I should have listened to my mother. She always told me to use corn cobs. I hope she doesn't stick her nose in my smoker next time she visits. Fifty year olds are not too old to spank. BC

GLEANINGS

JULY, 2005 • ALL THE NEWS THAT FITS

What's Missing?

READ YOUR LABEL & FIND OUT

While consumers might be paying more attention to what's in their foods thanks to the release of the new USDA Dietary Guidelines, there is still possible confusion over what's NOT in their food.

Many consumers, especially in light of the recently revised USDA Dietary Guidelines, have begun paying closer attention to the labels on their food. What consumers may not be doing, however, is reading labels to see what's *missing* from the ingredient list. In fact, just because a product has honey in its name, doesn't mean there's actually any honey in the product according to a newly released national study of 400 household primary shoppers, conducted by the National Honey Board.

The study shows that virtually all consumers, when presented with a product with the word honey in its name, expect the product to not only actually contain honey, but also use honey as the primary sweetener. That means many are completely unaware that numerous products containing the word honey in their names not only do not have honey as the primary sweetener, but they may not use honey altogether.

"Using the word honey in a product's name not only invokes a sense of purity and natural goodness, it also leads buyers to believe that the product is using honey as its primary sweetener," said Bruce Wolk, director of marketing for the National Honey Board. "For consumers to then read the label, and find honey missing from or at the tail end of an ingredient list is a violation of consumer trust."

To help avoid confusion when purchasing products with the word honey in the title, consumers should review ingredient labels to determine if honey is actually being used as a primary sweetener. Ingredient lists include nutrients and other ingredients used to formulate the product, in decreasing order by weight. Therefore, if honey is the first sweetener listed in a product's ingredient list, consumers can feel confident that the product is using honey as the primary sweetener. If honey is not listed at all, or is listed toward the end of the ingredient list, after other sweeteners, consumers should be aware that the product is not using honey as the primary sweetener, and any real or perceived benefit associated with pure and natural honey may not be present in the product.

The study asked consumers how likely they would be to purchase five different products that often contain the word honey in their name – honey mustard salad dressing, honey-glazed baked ham, honey cough drops, honey oats cereal and honey barbecue sauce – if those products actually contained no honey, or honey was not used as the primary sweetener.

On average, if consumers were aware that there was more of another sweetener in the product than there was honey, purchase intent dropped by more than half. If honey was not present or represented only a small portion of the sweeteners used in such products, two-fifths of respondents indicated that using the word honey in the product's name was misleading and shouldn't be used. In addition, more than two-thirds of respondents said they would be willing to pay up to 15 percent more for a product made with real honey. This was particularly true of honey cough drops, as many consumers perceive the honey in cough drops to be an active ingredient. Three-quarters of survey respondents were willing to pay more for honey cough drops made with real honey.

In fact, existing FDA guidelines for sweeteners and table syrups say that a statement identifying a flavor (other than in an ingredient list) may be included on a label *only* if the flavor contributes the primary recognizable flavor characterizing the syrup. Therefore, when honey is represented as the characterizing flavor in the name of a product, the total quantity of honey "shall not be less than 10 percent by weight of the finished food" (USDA Code of Federal Regulations; Title 21, Volume 2).

"Beekeepers for many generations have worked incredibly hard to harvest and produce the pure, high-quality honey that consumers trust and love," said Wolk.

Based in Longmont, Colorado, the National Honey Board provides consumers with honey information and recipes at www.honey.com, and serves U.S. honey producers, packers and importers through honey research, promotion and marketing.

USDA - 1, Cowboys - 0

BEEF BOARD WINS CASE

In late May, by a vote of 6-3, the U.S. Supreme Court upheld the Beef Promotion and Research Act of 1985, overturning lower court decisions by the U.S. Court of Appeals for the 8th Circuit and the U.S. District Court for SD, which ruled the measure unconstitutional.

"I am extremely pleased that the U.S. Supreme Court overturned the lower courts' decisions and ruled in favor of the Beef Checkoff Program," said Agriculture Secretary Mike Johanns. "This is certainly a win for the many producers who recognize the power of pooled resources. As this administration has always contended, USDA regards such programs, when properly administered, as effective tools for market enhancement."

As a result of this decision, the Beef Checkoff Program will continue without interruption. USDA is reviewing this decision to determine its implications for other first amendment challenges to checkoff programs.

Under the Beef Promotion and Research Act of 1985, the Cattlemen's Beef Promotion and Research Board develops budgets and awards contracts to carry out a coordinated program designed to strengthen the position of beef in the marketplace. One such contract resulted in the highly recognizable "Beef It's What's for Dinner" campaign.

The mandatory program is funded by an assessment of $1/head collected each time cattle are sold. All producers owning and marketing cattle, regardless of the size of their operation or the value of their cattle, must pay the assessment. A comparable assessment is collected on all imported cattle, beef and beef products.

USDA's Agricultural Marketing Service monitors operation of the board.

Display Advertisers

Whenever Sister Clare talks about John the Baptist, her eyes twinkle, and she says, "He looked just like Father Theophane." Sadly, Father has gone from St. Benedict Monastery – and this good earth but I get what Sister Clare means. He was a bit angular, he had a full beard, and his hair could be wild. I always did think he looked like the Wild Man from Borneo. Or John the Baptist.

When John lived in the Judean wilderness, he reportedly lived on "locusts and wild honey." I have this on good authority.

It seems likely that John also ate bee larvae. If you and I were baptized in the Jordan River, wore camel hair clothing, raided wild beehives for food, and were already accustomed to dining on locusts, I suspect that we too would be inclined to sample the soft white flesh of immature honey bees.

Maybe you've run across old rotten logs that bears have torn into looking for grubs, when they can't find a beehive to knock over. Similarly, when a bear does dig into a hive, it's generally the larvae, more than the honey, that he's after. These bears aren't dumb. They're on to something.

Larvae as food compare in protein to pork or beef and contain absurdly high levels of vitamins A and D. A larval quarter-pounder (You want cheese on that?) would provide you with a five-year supply of vitamin D. Vitamins are in general supposed to be a good thing, but this is probably too much for one sitting.

Mang non won is a Thai rice topping. You marinate bee larvae in coconut milk, add sliced onions and citrus leaves, pepper it just so, then wrap the whole thing in linen and steam it. Mmmmmm.

In China, beekeepers have a reputation for virility. Imagine that. I learned this on the Internet. My source reports that Chinese beekeepers' macho reputation comes from consuming – you guessed it – honey bee larvae.

I assume that a hungry Chinese beekeeper would merely graze in the beeyard, as opposed to sitting down to a formal larval meal. But I don't know.

"Weng-Fei, Honey, will you need a lunch today, or maybe you'd just like to snack on larvae?"

Live bee larvae reportedly have a "sweet cream taste like oysters." More about that flavor later

I said, "Hey, Linda, those darned Chinese have come up with yet another honey bee product. This one sounds like it could be a draught from the Fountain of Youth. Forget Social Security. We could market this and be set for our Golden Years."

"That's gross," she laughed. "I don't know how anyone could eat bee larvae."

Drone larvae are especially attractive to *Varroa* mites, so I sometimes monitor *Varroa* populations in my hives by scratching the waxy cap off drone cells, pulling out the larvae, and checking them. The mites' tiny, red, tick-like bodies show up in stark contrast to the milk-white flesh of the larvae.

Pre-pupal larvae look like little white grubs. Late in the pupal stage they look like ghostly honey bee mummies. Larvae range from very small to bee-sized, or bite-sized, you might say, if you're a dainty eater Drone larvae can definitely be big enough to munch on.

When I scratched open those drone cells to check for *Varroa*, some drone larvae had to die for the greater good. It was unavoidable. You can't just stuff the little darlings back into their little cells.

Now let me state that personally, I didn't believe the Chinese virility myth. None of this made any sense, and everyone knows that most of what you read on the Internet is made up, anyway. Think about it. Why would eating bugs make you feel like a teenager again? And why would you want to? Still, the Chinese invented acupuncture, and the experts once scoffed at that, too.

The flavor reports did intrigue me. Why would bee larvae taste like oysters? My curiosity was aroused. As a scientific study, this showed merit. Besides, these drone larvae were basically road kill. It seemed a shame to waste the meat.

I didn't tell Linda about this. I just opened up some hives and did it. How many larvae did I consume? I don't remember Certainly more than a few. But not a hundred. I didn't sauté them. I just popped them into my mouth. They weren't so bad.

Not that any of this has anything to do with you. You're a beekeeper, so you're probably a man over 50. Am I right? Statistically we beekeepers are mostly card-carrying members of the Over the Hill Gang, but that doesn't mean we need no stinking V***** No way. Have I gotten your attention yet?

The test results are in, and I'm pleased to report my findings: After careful evaluation and interpretation of the data, I'd say that – in my considered opinion – live bee larvae taste more like unsalted butter than oysters.

Ed Colby

John The Baptist

BOTTOM BOARD