FEB 2010

Bee Culture

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INSIDE . . .

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Grape hyacinths are one of the first Spring flowers to bloom and are a favorite early Spring source of both nectar and pollen. They start in February in the far south and as late as May in the north. (photo by Carl Albrecht, Charlotte, NC)

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

FEBRUARY 2010 VOLUME 138 NUMBER 2

FEATURES

DEPARTMENTS & COLUMNS

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Pollen Supplements

How can we evaluate pollen supplements?

It seems some people have no problems making claims and jumping to conclusions, but to me the problem is far from simple.

One of the things people write to me in favour of a particular patty is that the bees "like" them. I take that to mean that the bees eat them right up and look for more.

Obviously, attractiveness cannot be anything but good, since if the bees do not eat the patties, they can do no good – and they present a disposal problem.

However, attractiveness is no indication that the patty is actually helping the hive with its protein, vitamin, sterol, lipid . . . requirements. After all, bees gobble up bee candy and it has none of these.

The simple fact is that bees will eat anything that has enough sugar, so simple measures of consumption are not helpful, assuming that the competing patties are all eaten within a reasonable timeframe. Kids will eat candy, but we know that candy will not make a complete diet.

In some cases overly quick consumption might mean wastage or that the bees will run out of feed if replacement feed is not delivered promptly, and running out of feed is a stress that can result in underfed larvae or even removal.

Beekeepers who only plan to feed a little and once should use a slower patty than those who plan to pile it on and keep replenishing it.

So, consumption rate is not an good indicator. What is?

This is where things get really difficult because each beekeeper has different goals. Do we want lots of bees, or do we just want the bees we raise to be healthy? If we want big populations, then we want to stimulate the bees with a patty that the bees will gobble down and we had better plan to provide lots of that patty and lots of syrup if needed.

If we just want to ensure that the brood that the bees are raising are properly fed, then we want a patty that is not as "hot," and which is eaten when the bees feel the need, such as at night and when the wind blows or it rains for a week.

How can we tell if our patty works?

To me, the fact that we don't see bees with small abdomens and bees starving as they emerge, but do see more robust populations and better wintering tell the tale.

For others, measuring larger brood areas or demonstrating larger yields may be the target.

For free-flying bees, we will never be able to get an accurate measure, since we do not control the condition of the bees going in, or what they gather, and these things will have a huge effect on what we observe and what the nutritional deficiencies will be.

If you are trying to supercharge your bees, you may try to find a perfect diet, and spend the big bucks, but if you are like me, and just want to provide a fall-back ration and prevent the short-term starvation that so often occurs due to weather, then your criteria will be different.

Given the difficulty in measuring performance, the usual comparisons are made by comparing brood area in Spring between hives on various diets and subsequent honey yields. While these are indicators, they don't tell the whole story, so the hives should be followed for a year or more to see how they fare.

As time passes, though, the costs and difficulties multiply, so people tend to go back to, "My bees like it."

Allen Dick
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Bee Awareness

Upon reading the current *Bee Culture* I noticed many folks having my same point of view about educating the public when it comes to providing forage for our bees. I admire Lynn Kallus of VA who is happily of this frame of mind. We need to tell more people to leave their gardens in a more natural state and not care so much about having vast expanses of green grass. Especially in backyards, leaving some areas unmowed is beneficial to most wildlife and requires less work for us, more time to enjoy the outdoors! I know there are concerns about lyme disease and ticks but by also leaving beneficial bugs to do their work we hope they will naturally alleviate this problem. Also, planting native varieties of plants that bad bugs avoid is a good plan. I am currently reading *Bringing Nature Home* by Doug Tallamy a great resource for all gardeners and beekeepers. I am doing a "talk" with some of my local gardeners about this subject in January and raising "bee awareness" in this field (pun intended) and hopefully our bees will in consequence have some of their habitat restored to them. Now, about those pesticides – in Europe they have banned the neonics in question and as a result are experiencing good results with their apiaries that were in the vicinity of the treated crops. How about the good ole' U.S.? Seems to me a precautionary ban might be a good idea. It certainly can't hurt to remove pesticides from our environment and replace this with organic and less harmful methods. I am reading about organic farmers and organic beekeeping and they seem to do well together. No surprise there.

Maria Concilio
South Orange, NJ

Enough!

I have been keeping bees for the past 25 years, and of no surprise to anyone it is getting harder and harder just to keep them alive through the Winter. I haven't harvested any surplus honey in the past three years. In the past six or seven years I have had 50% to 75% hive losses every Winter.

As a hobby beekeeper I have kept up with the newest tech-

niques, newest equipment, and all the research. I have spent hundreds of dollars on every gizmo that might help. I have an attic full of this junk which has made no difference in the survival rate of my bees.

I know from reading *Bee Culture* that I am not alone. It appears the whole industry is going to Hell with no help in sight. I feel most sorry for those who depend upon beekeeping for a living. On the other hand, there are a lot of us old coots who would like to sit in the sun on a Spring day and watch the bees rather than having to clean up the dead hives once again.

Not only is it frustrating, but it is becoming more than can be afforded on a retirement income. I have five hives currently wintering in the back yard. I have decided when they are gone, they will no longer be replaced. Rather than sitting in the sun on an early Spring day and watching the bees, I'm going fishing. In comparison worms are inexpensive.

Harold Boretz
East Hampton, CT

On Bottom Boards

Enos Miller (Ogdensburg, NY) asked three questions in his letter to the editor (*Bee Culture*, December 2009 issue, page 09).

Here are the questions and my answers.

1. How do I [John Hoffman] keep the bees from using the open bottom as their entrance?

Answer: I don't. Since I use the screened OPEN bottom board system (OBB) and the Dead Air Space combination (*Bee Culture* Sept 2008, page 44, "Dead Air Space - A hive Configuration For All Seasons"), the large open bottom space is the only hive entrance available.

The first version of the OBB I developed in the Winter of 2004 (installed May 2005) included the traditional front entrance and landing ramp. This provided the bees with a choice of entrance. As the number of bees using the front entrance decreased the number using the OBB space increased. Within a week the vast majority of bees had chosen the OBB space. I suspect new bees hatching favored the OBB space as the natural entrance, while the old bees guided by habit, continued to use the front entrance.

To verify my assumptions, I provided several hives of bees with a choice of six entrances into each hive: The OBB space in the bottom, the traditional front entrance, a ¾" inch hole in both the front and rear panels of both the top brood chamber super and the bottom brood chamber super. The OBB space appeared to be the bees first choice almost immediately. After four weeks the OBB space was definitely the favorite on every hive with a few bees (guard bees?) using the front entrance and the only activity around the four ¾" holes were obviously guard bees.

I immediately fitted each hive with an OBB design that omitted the front entrance and the landing ramp. This provided the bees with their chosen entrance and considerably reduced the construction labor and material costs of the OBB.

If you wish to continue using a front entrance for old time or appearance sake that's your choice. However, I prefer making the honey bee's life as natural, easy and efficient as possible.

2. Will they [bees] not draw comb through the ½" mesh if they get crowded?

Answer: They definitely will, if you do not provide them with sufficient super space in a timely manner. However, they do not "draw comb through the mesh" they attach it to the bottom of the mesh. (For associated information reference Walt Wright's number 1. comment on page 51 of the Dec 2009 issue of *Bee Culture*) In this case, you don't have to tear down the whole hive to remove it you just reach up under the hive and break it off at the screen. The bees will eventually remove any remnants **if you immediately** provide them with sufficient space in the supers.

3. Don't you [John Hoffman] have strong hives?

Yes, I have what I consider exceptionally strong colonies of bees. However, because of my numerous ongoing research projects, I am not always able to maintain them in a timely manner. Thus, I encounter occasional problems such as the comb build up attached to the OBB screen. This is not always detrimental because it gives me the practical experience to answer such questions from other beekeepers.

Additional Information:
In your letter, you state: "This Spring I got six mesh instead of eight mesh and now the bees are squeezing through the mesh . . .". When deciding what mesh size to use, there are a number of factors to consider. Some food for thought.

Not only must the mesh size be large enough to allow easy passage of the worker bees, drones, and queens but also worker bees that have their hind leg baskets filled with pollen. If the pollen is knocked loose, coming in through the mesh, the bees may die during the Winter due to malnutrition (lack of protein found in pollen).

I stand by recommending and promoting the use of ½" mesh as the only critter guard selection for OBB systems.

John Hoffman
Mt. Holly Springs, PA

Screened BB Wintering

The September issue of *Bee Culture* carried a letter from Julie Pierzina about problems she had with a Screened Bottom Board (SBB) and an Open Bottom Board (OBB). I wonder if the original problem of propolis and debris on the SBB at the end of Winter was caused by a mouse guard.

I have noticed that debris can get trapped inside a standard Mouse Guard (1) where the bees enter and exit via round holes. These holes also dislodge pollen from the legs of returning foragers. I use a strip of perforated metal as a mouse guard. I fix it across the hive entrance leaving a bee space below part or all of the strip for bee access. As a legacy from using solid floors (bottom boards) in Winter, I also tilt my hives (UK Nationals)(1) forward by means of a 1 inch block under the rear legs of the hive stand (1).

Please excuse the references to a UK supplier but the Thorne's online catalogue does picture these items which may be useful for some of your readers.

Colin Taylor
Bury, Manchester, UK
(1)**www.Thorne.co.uk**

Apitherapy & MS

I have been a subscriber to *Bee Culture* for over 20 years, but I have never seen this situation addressed.

I have a friend with MS. She has had much success with bee venom therapy, only to regress each Winter without available bees.

They have asked about putting the hive in an underground root cellar, with double doors. I am at a loss to help. I'm hoping someone out there has tried this and knows what it takes to keep them alive and a good way to get a supply every couple of weeks (to be kept in a jar) or just to get stings every week.

If you could see the success she has had, you would understand how serious they are about doing this.

Sheri Kisch
Laurel, MT

Editor's Note: *Check out* ***www.apitherapy.org*** *for supplies of bees in cages that can be shipped to your home and for the web site's discussion groups' coverage of a variety of topics. Also visit* ***www.Beeculture.com****, find the link 'Find The Beekeeper' and find an association near you for beekeepers who may be able to help.*

Small Cells Or Not?

Reading the article "The Small Cell Foundation and the *Varroa* Mites" by Jennifer Berry featured in the November issue brings up one question: Do small cell foundations work in *Varroa* control or not? The author of the scientific study says no and claims that the scientific methods are based on an "unforgiving objectivity" and mitigate against bias and presupposition. On the other hand the author's friend, Bill Owens, and many other beekeepers say yes, based on own experiences. Who is right? Should small foundations be used or not? In my view, the scientific study has not more truth and value than the personal experience of many beekeepers. Both realities, that small foundations work and that it doesn't work, coexist simultaneously as potentials. It takes a conscious mind (the beekeeper or the scientist in this case) that determines which of these two potential realities will manifest and be experienced. But what really triggers the outcome is the way of thinking! Bill Owens, influenced by many success stories, thought and believed that small foundations work and it does. It is his reality that it works. The science group on the other hand thought it would not work (their "null hypothesis") that they supposedly challenged but nevertheless, they manifested the reality according to their thinking: small foundations did not work for them. In short: What we think matters! Bill Owens, the scientists, you, and me: we all experience the reality of our thoughts. What we think really matters. I simply thought this article is demonstrating that in a beautiful way. My point here: If small foundations work for you, don't give it up because a scientific study says that it doesn't work!

P.S. Modern science calls it the Observer Effect. Two wonderful videos explain the Observer Effect: The Conscious Universe - The observer effect: **http://www.youtube.com/watch?v=U3_FBisoKD8&feature=related**
The Consciousness of the Universe: **http://www.youtube.com/watch?v=lJPRBe_Hz2I&feature=PlayList&p=D96F552A9499DA81&index=1&playnext=2&playnext_from=PL**

Thomas Mani
Yelm, WA

Bob Watches The Hive

We have one solitary hive that was weak so we brought it home from the apiary to keep a closer eye on it. Well, we got an extra set of eyes to watch it also! In our atrium, it is a quiet area to be able to see the hive and the bees working and see how they are doing there. You just go into the shower in the house and look out the window to see the hive right there outside the glass. This morning I went to check on them and there he was. Our resident black snake "Bob." He's always nosey and checks up on what we are doing and hangs around our garden areas for bugs and other bad snakes!! He is about 5½ feet long. We just let Bob alone and let him do his job. He takes care of all the unwanted critters we get in the yard. This morning I caught him in checking out the newly placed weak hive. We don't know whether he is trying to eat the bees or if he smells the honey. We aren't sure why he is attracted. If any of your readers has information on black snakes and bees and if we should be worried or not, we would appreciate the information! Till then we will keep scooting him off so he doesn't try and enter the hive!

Ben & Teri Whitney
Ridge Manor, FL

Bob

Take The Survey

I, along with Wendy Schweigert and a team of her students from Bradley, will be conducting research about beekeepers and their characteristics. The results of this research will be used to identify characteristics of those who chose to become beekeepers, to compare various subgroups of beekeepers with each other, and to compare other groups with beekeepers.

If you are 18 years or older and keep bees you are invited to be a part of this research by completing short anonymous survey about beekeepers. We are interested in new beekeepers as well as those who are experienced. Hobbyist, sideliners and commercial beekeepers are all invited to participate. The survey can be found at **www.surveymonkey.com**. The survey will be available online until February 14, 2010.

If you have any questions about this research please feel free to contact Dr. Wendy Schweigert at **wendy@bumail.bradley.edu**.

To access the survey click on the following link, or cut and paste it into your browser. **https://www.surveymonkey.com/s/9NSWHZ5**

Larry Krengel
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INNER COVER

So, how's that regional queen rearing program going where you are? There's been a lot of them started in the past few years . . . noble and ambitious ventures, that's for sure. Over the two plus decades I've been here I've seen a lot of them start up . . . and all for basically the same few reasons, and generally even those few reasons all boil down to the same reason. And that is that the queens that were available to those who started these programs didn't measure up to what they wanted, or needed, or thought they should be able to buy from one of the suppliers they always bought from.

Beekeepers have always wanted 'better' queens. Queens that made bees that made more honey, ate less honey, and certainly ate less honey overwinter. Bees that easily withstood bitter cold and long and damp Winters, bees that got up earlier, stayed up later, tolerated the ravages of foulbrood, chalkbrood, mites, viruses and bacteria, and beekeeper's dumb mistakes with a smile but nary a breakdown.

When tracheal mites came along a few beekeepers had the audacity to believe they could breed bees that had more or longer hair, smaller tracheal openings, groomed more vigorously or simply refused to succumb to these new demons. They couldn't buy them anywhere because commercially they simply weren't being produced. These beekeepers didn't want their colonies dead every Spring and they didn't want to have to use any chemicals. These were the beekeepers that didn't jump on the pesticide bandwagon like everyone else, they didn't want treatments, and didn't want to have to keep bees different than last year, different than their fathers did . . . different than before. And the bees they could buy just didn't measure up. Weren't in fact, even close. Tracheal mites killed more bees than anything imaginable . . . even the government eradication programs. And they didn't want that, either.

Several significant programs were started that aimed to accomplish these goals, begun by beekeepers who wanted change and were willing to work for it. They gathered friends and like-minded beekeepers willing to go the extra mile to set up and maintain a breeding program. They knew someone had to make evaluations, slice bees and count mites, and choose the best of the lot this year, while watching the second place colonies die, and the researchers measure how well the chemicals were working. A few of these programs went three, four, a few even five years, picking and choosing and selecting and hoping to find that best of all queen. While all the others died. And all the time working a full time job, taking care of families and trying to keep the rest of their bees alive and producing and paying the bills for all those that died.

Meanwhile, some lonely beekeeper, the one who started all this, was keeping good records on selections, on how many mites, on honey production and gentleness, on drone colonies and breeders and production . . . and not making a dime on all this. Lost colonies, lots and lots of lost colonies, and not a dime, not a penny to be made. And the same goes for the rest of the worker bees in the programs . . . lots of work, lots of lost colonies, lots of time, some success, lots of average, but not a lot of progress.

How long do you suppose these programs last?

These endeavors were started by focused beekeepers that had idealistic goals in mind, a program designed to accomplish those goals, volunteers in place to engineer the science and management needed to make those goals a reality, and the desire and drive needed to begin and continue these programs. But then along came *Varroa*, and most of everything that had been good, died anyway.

But once again there were beekeepers that had the same goals, the same ideals, and the same fervor. We licked tracheal, they said, we can lick this one too.

Some chose the live and let die route . . . and devastating losses occurred. Ninty percent, 100 percent, two, three, five or more years in a row is what happened. But the fourth year . . . and the fifth...things began to turn around. But for those years before . . . the cost in dollars, the cost in time, the cost in emotional trauma was immeasurable.

Some, a very, very few survived and lived to tell the story. Yes, it can be done, yes, you can do it, yes, yes, yes.

It humbles me every time I see it, and when one in 100 make it work, another 100 line up to do the same . . . it's amazing.

Stage two of these programs starts up later, after there has been some successes and it's beginning to look like the light at the end of the tunnel is no longer a train.

Here's what often happens. Those original volunteers, those who did the leg work without being paid begin to grow weary of the chase. Three, four or more seasons, if they are doing this on any size scale gets expensive, and becomes nearly a full time job. Some stick with it, some have the time and money and drive and opportunity to keep going, but slowly, one by one, the initial group begins to disappear. Not all of them, and not all at once, but the trajectory of these programs is fairly predictable.

And money . . . who is going to make some money off this program? How can you make money from a program run by volunteers? At some point somebody has to say . . . OK, this season we'll sell some of these queens . . . we'll start getting our money back. If you've been there you know the story . . . how much do you charge . . . lots should be the answer . . . lots and lots . . . if they do what you say they will . . . and that is...?

Local queens . . . survivor queens. If they've made it through three or four seasons, locally, and the mating has been mostly controlled, you prob-

Producing Local Queens. Not Easy, But Very Rewarding

ably have something . . . how many you'll have is another question, and when you'll have them is still another question. July queens are not yet the first choice of many beekeepers . . . April, March, even February is when beekeepers want queens. Pollination contracts, early honey flows, need to build a big population by mid Summer, not just starting in July. The producers of the Canadian Buckfast queens had to deal with that mindset for some time. I'm not sure they ever overcame the resistance to mid-summer splits for strong colonies next Spring.

What about failure . . . that is, a buyer installs one of these July queens in a nuc to get established . . . and she dies, immediately, or sooner, or later, or, well, she was alive a bit ago . . .

A third generation commercial queen producer told me long ago that he just loved seeing us publish articles on how to produce queens. I found that a bit odd, and he said, "Oh no, it's great when you do, because once your readers try this and find out how hard it is, and how much harder it is to please most beekeepers, they give up after one try and come back as an even better customer. No, you just keep printing those stories. We don't mind at all."

For the most part, he was right. It is hard. It is expensive. It is labor intensive. And some of the customers are the worst customers in the world.

•

So, how's that regional queen rearing program going where you are?

Here's some thoughts on this I've gathered over the years, from groups that failed miserably – not from mistakes, but from overzealous idealism, mostly – and from groups that made it for awhile but then quietly folded, and from the few that did make it.

Support. Financial primarily, but also support to answer those 1001 questions that come up . . . this can be institutional, that is someone from a University, but if you're not supporting them, their support will be limited. But grants are available. Not many, and not for much, but for a startup program you don't need tens of thousands . . . just thousands. Even hundreds. SARE grants (**www.sare.org/**), USDA local grants (**www.grants.gov/**), State Association grants, Regional beekeeping association grants (**www.easternapiculture.org**) . . . there is money to be had if you look long and hard. And you do need to look long and hard. And you need a plan when you find a grant that might work. And you need to be able to write a grant in the first place. There are a fair number of SARE grant opportunities every season, and beekeepers have taken a good share of them over the years. Don't be shy.

Ask any University researcher how much time is spent applying for grants so they stay in business, compared to how many grants they get. If that's the route you choose, you need to be as committed as you are to producing that perfect queen.

Somebody needs to be in charge. Committees are OK for some things, but somebody needs to be in charge. Often, that somebody is a commercial beekeeper believe it or not. And that's a really good thing if you can find one. They have the experience, equipment, contacts, and opportunity to help cut costs. A retired commercial beekeeper may be the best person in charge you can find . . . they have all the right attributes, and some time to boot.

That committee you put together can make the plans, set up the beekeepers who will do the actual breeding and selecting, figure out how to pay for what's needed, and who will do the screening for each successive generation, and what criteria to select for and what techniques to use to measure that criteria . . . but somebody, at the end of the day, needs to make sure all these things get done and get done right. And if one of the participants isn't or can't make it work . . . fire them. And it's hard for a committee to fire a volunteer. A boss can.

The person in charge will probably be in charge of distributing, or selling the end result of this program. One program I am somewhat familiar with lets individuals sell the queens they produce from breeders selected by others. That way the load is distributed somewhat. If the breeding program is run by someone who knows what they are doing it will produce good breeders. Then, as long as those breeders go to a queen producer who is following a good set of guidelines, this kind of program can work. One very important consideration . . . don't bite off more than you can chew. The breeder producer need only produce a couple dozen breeders each season. The production queen producers then can produce . . . 25, 50, maybe as many as 100 queens to sell. But when you have a full time job, family and the rest, 100 queens is a whole lot of work. Maybe better would be 30 really good queens, raised 10 at a time.

If the person in charge is selling the breeders to the producers for a reasonable or preset amount (preset is probably better because then the breeder knows up front what's coming), the system should be self-funded, and most everybody gets paid a reasonable amount of money, in a reasonable amount of time. You avoid a lot of burnout that way. The challenge is to keep enough people selling those queens, and evaluating new stock. If the person in charge doesn't want a retail business . . . that is selling queens for a living . . . you run into similar problems again.

Handling complaints is a tricky part of the business. If I'm losing money on a venture, paying out more is asking a lot, especially if you are charging what a good local queen is worth. Until your group gets a bank account with some excess funds most are living hand to mouth. It pays to sell only good stock. You can, like Jennifer Berry's operation does, limit everything . . . how many you will raise, when you will send them, and when you quit for the season. Keeping it simple, small and easy to manage is a lot better than getting overwhelmed and over stressed.

•

There is potential for a lot of bumps in the local queen production road, but the more you anticipate these the better prepared you can be. Idealism is certainly the springboard for a program such as this, but hard work and stick-to-it-tivness is the fuel that keeps it going.

But the rewards can be outstanding. Producing queens that thrive in your backyard, raised chemical free to live in chemical free colonies and that are fun to work is the goal. It can be done. You can do it. So start now. Plan on having a program in place in your area this season . . . it's worth the effort.

But remember, no matter how difficult it gets or how glorious it becomes . . . you still have to keep your veil tight, your smoker lit, and your hive tool sharp.

This year will be better.

Kim Flottum

FEBRUARY – REGIONAL HONEY PRICE REPORT

This makes the third year in a row we've queried our reporters on management techniques and attitudes relative to how they care for their bees. For our reporters, bees are important, so keeping them alive is important. The chart here shows how these beekeepers do what they do, and when they do it, if at all, and it shows a three year trend in these activities. Pay particular attention to the changes over time for some of the general categories…like feeding, both carbs and protein. Look too at traditional *Varroa* treatments over time, and the IPM treatments…as one is going down, the other is increasing. Certainly a healthy trend. Check out your activities and see where you fit in.

Percent Using . . .

Treatment	Every Year Needed Or Not			Never Have, Never Will			Only If Needed		
	08	09	10	08	09	10	08	09	10
Nosema - Fumigillan	17	34	32	14	13	13	54	52	54
AFB Treatment	45	31	37	14	14	11	42	56	52
EFB Treatment	34	26	34	14	12	18	45	62	48
Feeding Carbs									
Sucrose	24	37	42	11	12	14	35	51	43
HFCS	20	18	28	24	46	44	18	36	28
Blend	8	15	17	24	59	58	15	27	24
Other - Honey, Fondant, etc.	8	18	19	17	44	34	20	38	47
Adding Feeding Stimulant	–	–	27	–	–	38	–	–	34
Feeding Protein									
Commercial Substitutes	15	27	48	60	40	22	25	35	30
Pollen/Homemade	–	18	18	–	61	44	–	21	38
***Varroa* IPM**									
Oganic Acids	18	23	23	42	44	40	38	33	37
Reg. Chemical Treatments	57	37	6	14	14	34	32	49	28
Powdered Sugar	41	28	29	34	46	33	25	26	37
Drone Comb Removal	31	22	17	38	43	30	31	34	52
Essential Oil Treatments	–	22	29	–	43	27	–	27	51
Small Cell	–	–	2	–	–	67	–	–	31
Old Comb Removal	34	40	57	–	17	4	66	42	39
Screened Bottom Boards	–	50	42	–	30	27	–	26	27
Small Hive Beetle Traps	–	–	13	–	–	44	–	–	42

REPORTING REGIONS	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.57	1.65	1.57	1.62	1.53	1.54	1.58	1.75	1.57	1.55	1.51	1.55	1.51-1.75	1.58	1.55	1.46
55 Gal. Drum, Ambr	1.59	1.55	1.59	1.40	1.45	1.39	1.67	1.55	1.40	1.59	1.38	1.46	1.38-1.67	1.50	1.45	1.36
60# Light (retail)	125.00	124.50	130.00	127.00	120.00	125.75	129.00	133.75	99.00	133.39	138.83	150.00	99.00-150.00	128.02	131.96	127.54
60# Amber (retail)	125.00	131.67	130.00	125.17	120.00	124.00	120.00	140.00	117.50	129.22	133.60	154.73	117.50-154.73	129.24	122.70	124.09
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	52.08	92.98	45.00	50.94	82.19	49.85	47.09	82.19	82.19	45.36	51.45	81.30	45.00-92.98	63.55	63.13	57.49
1# 24/case	71.04	81.82	74.40	69.70	98.00	78.70	74.04	80.80	54.72	97.44	82.47	88.65	54.72-98.00	79.31	78.32	78.60
2# 12/case	69.72	76.72	66.90	61.58	69.00	67.45	66.28	78.00	59.75	75.00	62.28	74.75	59.75-78.00	68.95	66.87	69.67
12.oz. Plas. 24/cs	64.32	79.18	54.00	68.22	90.00	57.60	55.84	66.60	55.00	57.60	67.48	67.53	54.00-90.00	65.28	62.33	62.29
5# 6/case	80.82	80.99	77.40	69.88	75.79	76.00	74.50	80.40	61.50	80.40	75.48	87.00	61.50-87.00	76.68	77.64	72.48
Quarts 12/case	108.73	124.96	112.20	103.15	96.00	95.00	95.54	96.00	108.73	107.94	93.96	108.00	93.96-124.96	104.18	103.71	96.46
Pints 12/case	67.30	76.48	66.00	68.75	68.00	52.57	68.06	62.40	49.50	69.30	55.00	63.00	49.50-76.48	63.86	59.19	57.19
RETAIL SHELF PRICES																
1/2#	3.13	3.42	2.36	3.25	2.29	3.33	2.89	2.65	2.95	2.75	3.13	4.00	2.29-4.00	3.01	3.36	2.82
12 oz. Plastic	3.25	4.13	2.98	3.75	4.33	3.89	3.42	3.94	3.10	3.13	4.20	4.38	2.98-4.38	3.71	3.74	3.79
1# Glass/Plastic	4.50	4.91	4.30	4.89	5.49	5.18	4.01	4.86	4.15	4.36	5.20	5.44	4.01-5.49	4.77	4.83	4.62
2# Glass/Plastic	8.50	7.70	8.07	7.38	8.15	7.99	7.15	7.92	6.65	7.64	7.77	8.50	6.65-8.50	7.78	7.98	7.77
Pint	7.68	7.56	6.50	6.68	6.50	6.09	6.67	6.59	7.68	9.83	7.46	9.50	6.09-9.83	7.40	7.36	7.08
Quart	12.70	12.98	11.00	10.72	10.45	10.23	10.32	10.93	12.70	14.30	10.30	13.33	10.23-14.30	11.66	11.65	11.04
5# Glass/Plastic	17.00	15.79	19.30	16.38	20.26	14.08	19.03	18.66	15.70	15.12	16.26	21.00	14.08-21.00	17.38	17.97	16.88
1# Cream	5.50	6.04	6.50	5.50	5.79	5.00	5.57	6.00	5.79	5.98	6.09	6.50	5.00-6.50	5.85	5.75	5.53
1# Cut Comb	5.50	5.77	6.50	5.90	7.13	5.83	7.11	6.00	7.13	7.50	7.75	8.50	5.50-8.50	6.72	6.71	6.95
Ross Round	6.01	4.65	6.50	5.50	6.01	6.50	6.79	6.50	6.01	6.01	6.83	8.13	4.65-8.13	6.29	7.02	6.55
Wholesale Wax (Lt)	4.75	3.94	2.75	2.80	2.15	4.93	4.80	4.50	5.60	5.00	3.21	3.69	2.15-5.60	4.01	4.03	3.05
Wholesale Wax (Dk)	3.75	3.36	2.50	2.59	2.00	4.00	4.27	4.00	4.36	4.36	3.01	4.36	2.00-4.36	3.55	3.11	2.68
Pollination Fee/Col.	80.00	80.00	65.00	43.20	125.00	58.75	53.67	60.00	89.44	89.44	70.00	130.00	43.20-130.00	78.71	72.48	79.31

a closer look

ISRAELI ACUTE PARALYSIS VIRUS & ITS RELATIVES

Clarence Collison
Audrey Sheridan

These viruses are complicated, deadly and difficult to diagnose.

Honey bee populations are known to be infected by numerous viruses that reside in colonies yet show no apparent signs of infection. Over 18 single-stranded positive 'picorna-like' RNA viruses have now been characterized as infectious to the European honey bee, *Apis mellifera* L. (Allen and Ball 1996). Morphologically, these viruses are similar, exhibiting isometric-shaped protein capsids of approximately 30 nm in diameter. They also share similarities within their genome (all the genetic material in all the chromosomes of a particular organism) sequences, particularly within the helicase, protease and polymerase domains of the replicase polyprotein and also with the order of these three domains (Baker and Schroeder 2008).

Acute bee paralysis virus (ABPV), Kashmir bee virus (KBV) and Israeli acute paralysis virus are closely related viruses from the family Dicistroviridae of the order Picornavirales, that can be analyzed as a complex of related species (de Miranda et al. 2009). IAPV and KBV share the highest genome sequence similarity of 96%, with IAPV and ABPV sharing 92% similarity and KBV and ABPV sharing 93% (Baker and Schroeder 2008). IAPV is closely related to KBV and ABPV, but is sufficiently different to be discerned by Polymerase Chain Reaction (PCR) and serology. All three viruses have a worldwide distribution and their pathology is quite similar at the level of the individual bee and colony.

With the recent findings that Israeli acute paralysis virus (IAPV) was strongly correlated with the presence of colony collapse disorder (CCD) (Cox-Foster et al. 2007), interest in understanding the role of this virus in the disorder, pathology and transmission rapidly increased. IAPV was detected in 25 of 30 (83%) CCD-affected honey bee colonies, but only once in 21 healthy colonies. This virus was also found in package bees imported from Australia and isolates of royal jelly imported from China. This was the first time that IAPV was identified in the United States.

IAPV was first discovered and described in 2004 in Israel (Maori et al. 2007b), where infected bees exhibited shivering wings, progressed to paralysis, and then died outside the hive. This virus has since been linked to heavy colony losses in Israel. One surprising phenomenon associated with IAPV syndrome is that only some hives in a group are affected, even though they are all exposed to the same environmental conditions and forage in the same fields. Dead bees were collected from a cluster of hives near Alon Hagalil, Israel and the virus was isolated from them. Maori et al. (2007b) inoculated healthy-looking bee larvae with viral homogenate from a single dead bee. The inoculated larvae died within four days. The virus was purified from the injected larvae and was found to be identical in sequence and infectious as the original virus. The injected larvae were found free of other known viruses by differential PCR. IAPV-injected adult bees died within four days. Bees fed on IAPV-infected cakes gradually developed symptoms and died within 10 days. Early on the only indication of infection was darkening of the abdomen tip. Between the 3rd and 6th day of infection, the thorax darkened as well, and the bees were unsettled; they were constantly going around in circles and barely flew or ate. Between the 7th and 10th days, the bees' abdomen and thorax became dark (dark brown to black), and the thorax became hairless. The bees stopped flying, barely moved, underwent periods of spasms, and eventually died.

"Nearly 80% of adult bees infected orally with IAPV die within a week."

Using DNA sequencing and phylogenetic analyses, Chen and Evans (2007), found evidence that IAPV was present in United States bees collected several years prior to CCD and prior to the importation of honey bees into the U.S. from Australia and New Zealand. They screened honey bee samples collected in California, Maryland and Pennsylvania from 2002 to 2007 for the presence of IAPV. The results of the survey indicated that IAPV had been circulating in U.S. bee populations since at least 2002. IAPV isolates from this study can be split into four distinct clusters, reflecting collections from the three states,

as well as Israel. California and Pennsylvania isolates each formed separate lineages while the Maryland and Israeli lineages were less well defined. Palacios et al. (2008) also analyzed IAPV obtained from bees in the United States, Canada, Australia and Israel and found at least three distinct IAPV lineages, two of them circulating in the United States.

The genome of IAPV consists of a single positive-strand RNA (Sabath et al. 2009) containing two long open reading frames (ORF), separated by an intergenic region (IGR) and flanked by non-translated regions. The larger ORF is located in the 5' half of the genome and encodes the non-structural proteins involved in virus replication and processing. The shorter ORF is located towards the 3' end of the genome and encodes the structural capsid proteins found in the viral particle (Maori et al. 2007b). Different IAPV isolates may possess different pathogenic properties associated with genetic variability across the 5' region of the genome, as this region is involved in the initiation of protein translation (Chen and Evans 2007).

So far, the only known host of IAPV is the western honey bee, *Apis mellifera* (Maori et al. 2007ab, Palacios et al. 2008, Chen and Evans 2007). IAPV normally persists at low titres within a colony, with no obvious symptoms at the individual or colony level (de Miranda et al. 2009). However, it is extremely virulent when injected into pupae or adults. Nearly 80% of adult bees infected orally with IAPV die within a week, with little difference across a 1000-fold range of inoculum concentrations (Maori et al. 2009). Little is known specifically about the transmission routes of IAPV, although much historical evidence may be obscured by the likelihood that IAPV may have been classified as a strain of KBV during earlier studies (de Miranda et al. 2009).

It has been found that a segment of IAPV is incorporated into some of its bee hosts genome, and that bees harboring the viral segment are resistant to subsequent IAPV infection (Maori et al. 2007ab). Reciprocally, segments of honey bee genome sequences have been found within defective-interfering-like sequences of a *dicistrovirus*. A survey in Israel has indicated that about

"Current ID techniques do not provide management information, such as routes of infection, or effective eradication methods."

30% of live bees carry IAPV sequences in their genome (Maori et al. 2007a). They have also found IAPV in *Varroa* mites as well as viral segments in the *Varroa* genome.

Maori et al. (2009) reported on RNAi-silencing of IAPV infection by feeding bees with double-stranded RNA, as an efficient and feasible way of controlling this viral disease.

RNA silencing down regulates gene expression by degrading RNAs in a sequence-specific manner, arresting the translation of a designated mRNA, or engendering transcriptional gene silencing involving DNA methylation and chromatin remodeling. Experiments were carried out to examine whether ingestion of dsRNAs of IPAV sequences would protect bees from subsequent IAPV infection. They demonstrated that IAPV-RNA can be silenced in bees by ingestion of a segment of IAPV-dsRNA and indicates that an RNAi-related pathway of silencing leads to viral RNA degradation. This dsRNA-engendered silencing was sufficient to greatly reduce bee mortality resulting from IAPV infection. The dying bees in the dsRNA-treated hives did not develop symptoms of viral infection, and their mortality rate was similar to that in the control hives. In a follow-up field test, neither bee count nor honey production were affected by dsRNA treatments indicating non-toxicity of the dsRNA. Treatment with dsRNA may be developed to be effective in the field, protecting colonies from IAPV, and possibly from CCD.

The appearance of CCD may indicate a past history of IAPV infection rather than a concurrent one (Maori et al. 2009). They speculated that IAPV-resistant bees, or progeny of such bees (if a queen or a drone has been affected and survived), have inherited the IAPV sequences, and are primed for CCD development by another agent, such as the mite, other parasites, or environmental factors.

Current molecular diagnostic techniques offer researchers the ability to differentiate between the three closely related viruses and confirm viral presence. These techniques, however, do not provide basic management information such as actual virus impact, likely routes of infection into the apiary (e.g. bees, food, wax and equipment) and effective methods of eradication (once infection occurs). The future challenge is to develop diagnostic kits within a decision support system that would allow beekeepers to make informed management decisions based on the result of the diagnostic test(s) employed (de Miranda et al. 2009). BC

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Managed Pollinator CAP
Coordinated Agricultural Project

Detecting Nosema In Time

Katherine Aronstein

Those of us working with bees have experienced significant changes in beekeeping practices in recent years. It seems that difficulties of keeping bees healthy has transformed routine management into an epic struggle for colonies' survival. Some of the problems can be explained by the introduction and spread of new diseases and microbes that have become resistant to drug treatments. We recently described one of these mechanisms for drug resistance in AFB bacteria (Murray and Aronstein, 2006). The increased use of synthetic insecticides inside and outside of beehives has not helped either. Combinations of different pesticides (even when they are not highly toxic to bees when used alone) can produce unintended results by affecting the overall health and immune response of bees, making them susceptible to a variety of diseases and stressors (Reed et al., 2009).

Threatened with losing essential pollinators, the U.S. Congress has approved increased levels of bee research funding to discover and mitigate the causes of bee decline. Did bees experience the effect of a new yet un-identified factor (e.g., disease, pesticide etc) or is this the same old problem showing its ugly and exaggerated forms? Whatever it is it is now a major focus of several investigations. Scientists are looking at the root cause of the Colony Collapse Disorder (CCD) syndrome, searching for new diseases, harmful chemicals or a combination of these factors which could inflict stress on bee colonies pushing them over the edge for recovery. Many of these urgent questions will be addressed in our new multi-institutional USDA Coordinated Agricultural Project (CAP) by systematically analyzing bees, pollen and wax samples collected from stationary apiaries.

Among multiple suspects identified so far, bee viruses and a microscopic *Nosema* parasite have attracted the most attention in the press, and rightly so. Most of these are intracellular parasites which are undetectable by visual colony examination. When bees are finally showing sign of the disease, it is for the most part too late to save the colony since most of the bees are infected and dying.

Nosema apis has been known to occur in the United States since at least the 1950s, but its presence in bees has been a matter of mixed concern. When infected bees were found crawling in front of the colonies leaving yellow strips of diarrhea, they were normally treated with antibiotics (Higes et al., 2009), and that took care of the problem. Then why is it that scientists now suspect *Nosema* in recent losses of bees? Some scientists even point to *Nosema* as the primary reason for CCD (Higes et al., 2009). Apparently, a new species of *Nosema* (*N. ceranae*) is now widely spread in the U.S. and around the world, silently replacing *N. apis*. Little was made of this discovery in 1996; but concern was reawakened in 2005 when bees in Asia were observed suffering from the disease. In 2006 *Nosema ceranae* was detected in Europe causing heavy loses of colonies in Spain, France, Germany and Switzerland (Higes, et al., 2006). Since this new species is not readily detectable in the apiary, infection goes unnoticed for a long time. Bees could be infected for weeks and not show clinical signs of the disease. The microscopic identification of this new species is also a challenge since both *N. apis* and *N. ceranae* spores look similar when observed under a microscope. Therefore, for species identification, bee samples are normally sent to a laboratory capable of DNA amplification. In the laboratory, scientists can determine genetic differences between the two species of *Nosema* using PCR. Since *N. ceranae* infected colonies can die much faster, survival of the colonies depends on a timely detection and treatment of the disease. However, precious time is lost waiting for lab results. Therefore, development of a rapid and simple identification tool could save an entire apiary and prevent disease epidemics.

Dipstick assay

The idea behind this tool is not new, being based on the principles of immunology (antibody-protein interaction). The tool is often designed in a dipstick format for easy use in the field or home. Although antibody-based dipstick tests involve sophisticated technology derived through research and development, the actual products are user-friendly and packaged as a kit of reagents. Such methods have been developed for the detection of medically important diseases and their insect vectors and the detection of HIV in human blood. Perhaps the most familiar use is the home pregnancy test.

By adapting this technology to beekeeping needs, it will be possible to develop a simple and error-free method for the detection of the *Nosema* infection in bee samples.

This research is currently being conducted at the Weslaco Honey Bee Research Unit (USDA/ARS) as part of the CAP project. The final product, ➢

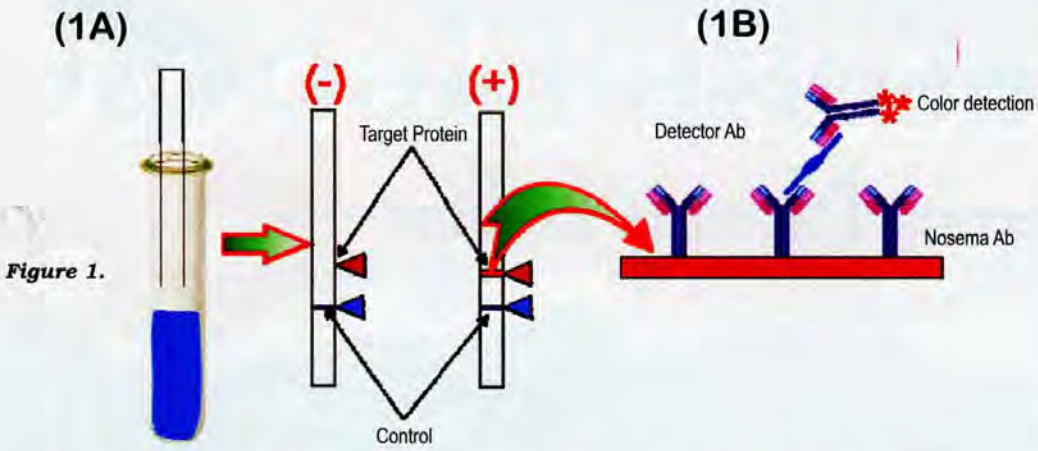

Figure 1.

a dipstick assay for the detection of *Nosema* spores in bee samples, will be developed in collaboration with private biotechnology companies. Some of the companies have already received our proposal.

How does it work?

A kit will contain multiple strips of cellulose, each of which is intended for a single use. After crushing a bee or the dissected guts from several bees in a vial with reagent, a strip of cellulose is inserted in the homogenate. A few moments later, either a single or a double band will appear. A negative result is indicated if only one blue band (control) is visible (see (-), Fig. 1A). A positive result is indicated if two bands are visible, one blue for the control and the other red indicating the target *Nosema* protein (see (+), Fig. 1A).

• discourage unnecessary treatments • • encourage timely treatments • give regulators a better tool regarding bee movement • give queen producers a way to self-regulate their products •

Nosema ceranae antibodies (Ab) are incorporated into the cellulose strip and serve as a "red flag" and an anchor for the immunogen (a *Nosema* protein). The immunological reaction is based on a very strong bond that develops between *Nosema* Ab and the *Nosema* protein which was originally used for the development of this Ab (Fig. 1B). When *Nosema* spores are added to the reaction mix, the Ab will bind to the *Nosema* protein and form a very strong bond. If this reaction is coupled with color detection using secondary antibodies (Detector Ab), the appearance of two color bands (control and *Nosema*-specific) indicate the presence of *Nosema* spores. The appearance of a single color band (control) indicates negative results.

Since the basic idea behind the test is not new, many before us have attempted to develop such tests. However, a poor quality of antibodies, a lack of specificity, and a low level of sensitivity are the main difficulties that have prevented the successful development of a quick test. Antibodies are usually produced by injecting a foreign protein (immunogen) into animals such as goats, rabbits, rats, or mice. The animals' immune system then detects a foreign invasion and responds by producing antibodies. Clearly, the quality of the antibodies can make an immunological assay a success or a failure. How well antibodies detect the original immunogen depends on its type and purity.

When immunogen is produced in the laboratory, the time, effort, and resources required for its synthesis can be substantial. It is challenging to make a pure immunogen. Contaminating molecules can serve as secondary immunogens, resulting in antibodies lacking specificity. We decided to avoid this mistake by choosing a novel way to develop antibodies, the so-called Genomic Antibody Technology (GAT) (Fig. 2). The use of this technology is a completely new way of thinking about immunogens. Using GAT technology, a piece of circular DNA (plasmid) containing the DNA sequence encoding the protein of interest (*Nosema* in our case) is injected into the animal. A pure protein is then produced directly in the animal (and by the animal), thereby bypassing the normal lengthy protein production procedure in the laboratory. In-vivo expressed protein is recognized by the animal as a foreign invader which, in turn, triggers production and release of antibodies in the animal's blood.

One difficulty of using GAT technology is that it requires prior knowledge of the protein sequences. That is a serious obstacle unless the pathogen's genome has been sequenced. Fortunately, both *Nosema* genomes are being sequenced by the USDA. We were able to identify a target protein sequence located on the *Nosema ceranae* spore wall (the DNA sequence provided courtesy of Dr. Jay Evans, Beltsville Honey Bee Research Laboratory, USDA/ARS). We are now testing our new *Nosema ceranae* antibodies on bee samples. So far our tests show a high Ab sensitivity that can detect *Nosema* spores in crude bee homogenates at a 1:5000 dilution, similar to commercially produced Abs. We are also testing the minimal amount of spores that can be detected by the test. Using routine gel-based laboratory methods we determined that our new Abs can detect one infected bee among one thousand non-infected bees. This level of sensitivity will allow for the detection of very low rates of infection in bee colonies.

Who will be able to use this test?

The test is not intended to replace current methods used in research laboratories. There is no need to replace high throughput technol-

Figure 2.

ogy designed for processing large numbers of samples. Instead, it will help beekeepers, hobbyists as well as commercial beekeepers to detect and monitor the progression of the disease in the field. It will help beekeepers make educated decisions about disease management. Most impotently, this new tool will (1) encourage reduced use of antibiotics since it will discourage unnecessary treatments, (2) give regulators new decision-making tools in regard to inter-state and international bee movement, and (3) give producers of queens and package bees a means to detect and monitor Nosema levels in their production colonies. BC

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LANGSTROTH . . . BEE BIOLOGIST

Roger Hoopingarner

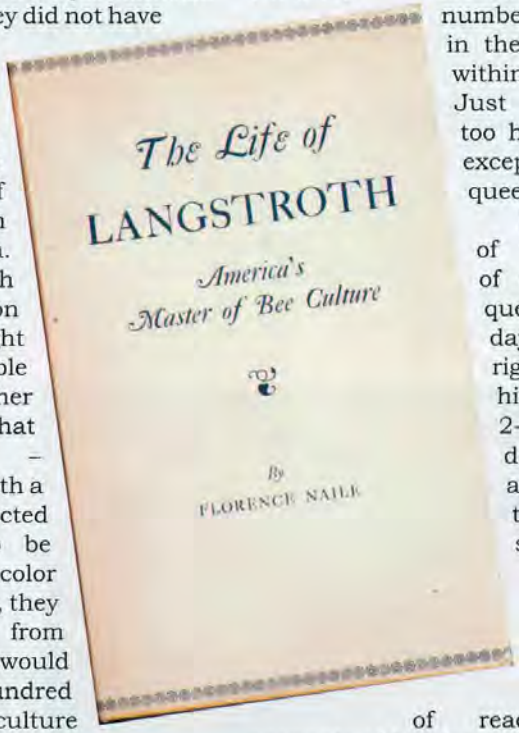
It is interesting, and sometimes difficult to look at the state of apicultural science at the beginning of the 21st century and try to compare it with what was known and what wasn't known in the middle of the 19th century. When I am able to make a comparison I am often amazed at the understanding that L.L. Langstroth had about the honey bee. Then sometimes I also realize that much of what he was able to learn about bees, and what science has learned since, were made possible by the invention of the movable-comb hive. It was a window that he opened to the beekeeping world that up until then had been closed. Very early in his book, "*The Hive and the Honey Bee*", Langstroth compares the movable-comb hive to an observation hive. The comparison is very valid as one can open the hive a see everything that one can see in an observation hive.

One of the things that Langstroth had going for him was that he, first, was a good correspondent and had beekeeping friends that he often wrote long letters to, and had many responses from, as well. He also had a good education at Yale and was able to read the ancient Greek literature on honey bees. It was also fortunate that he became friends with Samuel Wagner (who later became the first editor of the *American Bee Journal*). Mr. Wagner was fluent in German and had access to many beekeepers in Germany and read their bee journals. Thus, Wagner would often apprise Langstroth of what was going on in Europe at the time.

All this said and still you have to admire the insight and keen observational skills that Langstroth brought to his beekeeping. By the time of his invention of the movable-comb hive in 1851 (patented in 1852) he had been keeping bees for 13 years. Not a long time, yet he had certainly had many different experiences, and probably many of them not all that pleasant. Remember, he was keeping German (European) black bees in box hives without the benefit of a smoker!

Probably the most significant scientific contribution that Langstroth made was in identifying the spermatheca as a receptacle for the storage of sperm. In the winter of 1851-52 he sent a queen to a Dr. Joseph Leidy, of Philadelphia, who was a microscopist and naturalist. He determined that this small sac that connected to the oviduct had material that looked like spermatozoa. The next season Langstroth sent him a drone and the sperm matched what was in the spermatheca. (The spermatheca had been shown in a dissection and publication by Swammerdam in the 1630s, but its function was not known.

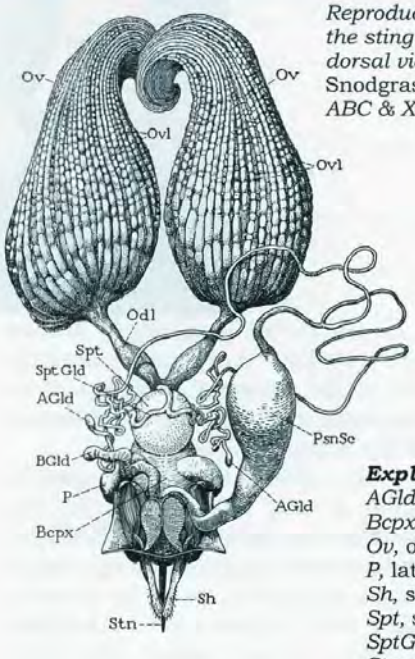
Sometime later Langstroth found that a queen that had failed also had no sperm in the spermatheca. Unfortunately, they did not have a device like a haemocytometer that would have allowed them to determine the amount of sperm within the spermatheca. Armed with that information Langstroth might have been able to solve another mystery that bothered him – crossing a dark with a light bee. He expected all the bees to be intermediate in color and they were not, they were all kinds from light to dark. It would take another hundred years before apiculture scientists determined that a virgin queen mated with several drones over a two or three day mating period. It is the fact that a queen mates with many drones that provides the genetic diversity within the colony that allows it to maximize its fitness for the different duties within the hive.



His observation that queens often do not have sperm in the spermatheca beyond the second year underscores a point that replacing a queen every year, or at least every other year, makes good beekeeping practice. It also makes the point that queens rarely live three or more years, which is often cited in bee books on the longevity of queens.

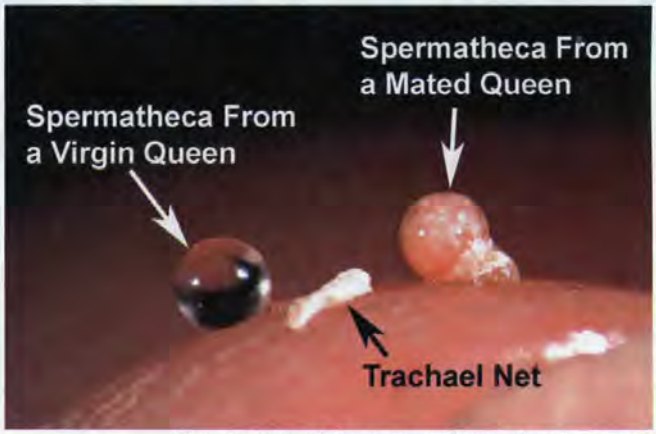
He determined that a good swarm had about 20,000 bees and that a colony would have two or three times this number. By far, the best estimates of colony and swarm populations for many, many years after Langstroth. Even today there are books that cite numbers of bees in the 90-100,000 within a colony. Just about twice too high with the exception of two-queen colonies.

His estimate of the number of eggs that a queen lays in a day were again right on as his figure of 2-3,000 per day matches almost all the research since then. However, I now think Langstroth fell into the trap of reading other accounts of how long a bee lived and cited two or three months or more for a worker bee's life span. He did not do the math because even if you



Reproductive organs and the sting of the queen, dorsal view. (by R.E. Snodgrass taken from *ABC & XYZ*)

Explanation of Abbreviations
AGld, poison gland of sting
Bcpx, bursa copulatrix
Ov, ovary
P, lateral pouch of bursa copulatrix
Sh, sheath lobes of sting
Spt, spermatheca
SptGld, spermathecal gland
Stn, shaft of sting



Comparison of the spermatheca of a virgin and mated queen. Tracheal net coverings have been removed. (Sue Cobey photo taken from *ABC & XYZ*)

multiply 2,000 eggs (bees) per day for 90 days the colony has a population of 180,000, which is three times Langstroth's own highest figure. However, I have seen modern-day scientists fall into similar number traps.

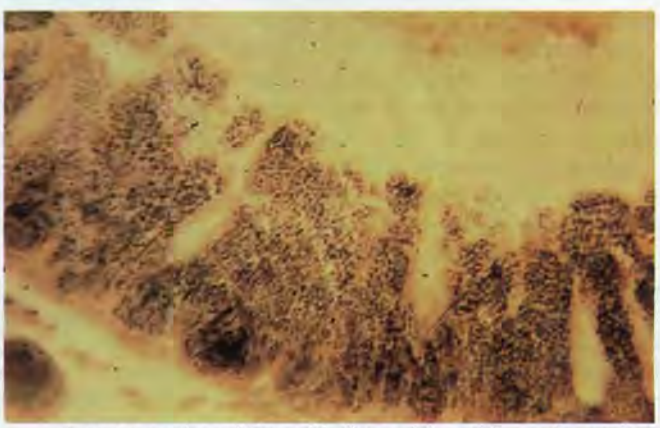
I am intrigued by Langstroth's observation that bees that leave the hive on cold days during the Winter are diseased and the colony is better off with these bees out of the Winter cluster. It was much later that scientists discovered nosema disease (*Nosema apis*) and that indeed the bees that leave a hive during cold weather are full of the spores of the disease. What intrigued me is that Langstroth does not indicate why, or how, he decided that this was a disease – he was just perfectly right in his diagnosis.

His observation that bees prefer to collect fresh pollen is well known today, but was certainly an important contribution at the time. New incoming pollen changes the whole dynamic within the colony, and causes all kinds of changes, *e.g.*, increased brood rearing or the production of drones. Langstroth also noted that a colony could produce brood food from pollen and honey within the colony. It wasn't until much later that scientists confirmed that pollen was necessary for the continued production of brood food.

Throughout his book *The Hive and the Honey Bee,* Langstroth keeps dropping little gems of insight on bee biology. Many of these tips beekeepers would do well to remember, as they would certainly help in their management of their hives. For example, he says if a colony does not expel its drones when all of the other colonies in an apiary do, that colony is very suspicious. It either is queenless or the queen is failing. The colony is keeping the drones in case they are needed for mating with a replacement queen. This is the kind of basic biology that a beekeeper needs to keep in their memory bank, as it could be the difference between saving a colony or losing it because of queen failure.

Langstroth was a little ambivalent about queen pheromones. In some places he is quite clear that the queen is leaving, or imparting, something that the worker bees recognize.

Spotting (dysentery) of hive bodies caused by Nosema.



A cross-section of the epithelium of the mid-gut of a worker honey bee showing Nosema spores (dark spots).

Then at other times he seems to miss the concept. But then, again, it took another hundred years before the queen pheromone was identified and quantified, so I think we can excuse Langstroth if he was a little confused by the concept.

One of the tenets of modern beekeeping is that we can add extra space or remove honey quite easily. Now think about the possibility of doing that with a box hive or skep – quite impossible. Deep into the book, Langstroth introduces the concept of adding another box (a super in modern terms) to the hive for filling with honey for removal. A concept that was made possible by the movable-comb hive.

There are many, many other tidbits of beekeeping lore and beekeeping biology that are in the pages of his book. However, my goal here was to give you some feeling for the beekeeping scientist that L. L. Langstroth was. However, there was one other major development that Langstroth helped to give to modern beekeeping that I should mention, and that was the importation and development of the Italian bee, but that is a story for another time. BC

Roger Hoopingarner is Michigan State University Extension Specialist in Apiculture, retired, and the author of The Hive & The Honey Bee, Revisited – *An Annotated edition of LL's 3rd edition.*

What Kind Of Bee?

Larry Connor

It is a good time to cover a subject that some beekeepers ask me about and many more WANT to ask – *What kind of bees do I have inside my hive?* Here is a letter I received in December. It sets up the rest of this article –

Dear Dr. Connor,

I had the pleasure meeting you at the WAS conference in Healdsberg CA in August 2009 at which time I purchased several Wicwas Press publications. I have been enjoying reading them and learning a lot. I have to admit that I am not an academic but I am fascinated by science and nature. Gardening and beekeeping keep me quite busy, not to mention my four-year old son.

Anyway, I started beekeeping by jumping in and collecting my first colony out of somebody's wall. That colony is my strongest. I have attached some photos and I am wondering if you are able to identify WHAT KIND of bees I have. Can anybody (any expert) identify a bee type just by looking at it? Or does the DNA have to be looked at?

All I know about my bees is that they lived in the wall of these people's house in El Sobrante for probably six years before the neighbor contacted me through a post on Craigslist for free bee removal. I learned a lot from doing this and other removals, but I learned more from reading your book Increase Essentials. I think I will focus on collecting swarms this spring and try some queen rearing for requeening. I live in the city of Berkeley so I am a little limited on space, but I'd like to have a whole bunch of hives.

I tend to write too much so I'll just leave it at that and remind you that I just really want to know what kind of bees I have. Oh and my guess is Italian, because they don't produce a lot of propolis around the entrance (as seen on page 12 of Rearing Queen Honey Bees).

My fellow beginner beekeeper friends are wondering why some bees are so pale (yellow almost grey) and others have a lot of black? Is this a developmental/age characteristic that changes as bees grow older? Or is it just genetic like having kids with different color hair?

Thanks for your help.

Sincerely,
Alice Rosenthal
Berkeley, CA

PS Can you tell me anything else about my bees from the photo?

Here was my reply to Alice –

Hi Alice

With a few noteworthy exceptions (Russian, certainly Carniolians) most stocks in the U.S. are a mixture of several races or subspecies of Apis mellifera L. The subspecies is shown by the third part of the Latin name. For example, Apis meliffera carnica Pollmann is the Carniolian subspecies or race of honey bees. (The name following the Latin is the person who first described this species or subspecies) Beekeepers often market certain races, but in North America they may have poor parentage records and/or no control over the drone population. I like to think that we have North American bees, for what it is worth.

I will get back to you (I hope) with a more detailed answer, but DNA is the only defining technique, although certain Europeans use wing dimensions and vein angles for separation. It is a science loaded with lots of variables.

What might be more useful is a summary of the behaviors of these bees, since certain races have unique behavioral traits.

Enjoy your bees and your son. Does he have his own bee suit?

Larry

Here is my 'more detailed' reply to Alice's questions. It is a good letter to base an article upon, and gives me a chance to express my thoughts on a number of issues. Alice provided photos of the queen and her bees, and after tweaking them in Photoshop I am absolutely sure they are honey bees, *Apis mellifera* L. (No surprise there). But I will not guess which race or races make up their genetic heritage but feel sure there are undoubtedly several present. There is some variation in the appearance of the worker bees (Alice's friend noted that some of the bees were 'pale' which I take to mean they are a light yel-

"You want them to be Italian, call them Italian."

low-grey in color. Several races have grey in their color pattern, including *carnica* and *caucasia*. In the photo I see more yellow with the whitish-grey bands, so this just adds to the confusion.

Color variations in workers reflect the multiple mating of drones to the queen. In turn, if you produce daughter queens from such a queen, you would expect to find considerable variation in the color and banding of the resulting daughter queens. Even if the queen came from a pure race of bees like Italian (*ligustica*) or Carniolian (*carnica*), that had been carefully maintained by instrumental insemination, in most of North America their naturally mated daughters would not produce pure Italian or Carniolian workers. Instead they would be crosses between the mother line and whatever hodge-podge of drones found in the area where they were mated. Unless using an island or remote mountain valley, it is unlikely that a single beekeeper would be able to control the drones in the roughly six mile radius (a land area over 72,300 acres) that queens and drones will fly for sex.

Bee Sex Essentials reviews the number of drones that mate with queens and more about reproductive biology. But for the local beekeeper, just imagine all the colonies in your six-mile radius. When I think about the full range of colonies around the Farm (72,300 acreage is a Lot of real estate!), I recognize that any queens mated there are likely to encounter drones from a wide range of colonies – packages from Georgia and Texas, nucs from Georgia and Florida, and full-sized colonies kept in areas of the South where African colonies have been found. That does not make the colonies African, but it does mean that some of the drones may carry genes from the African bloodline.

For commercial queen producers, there has been a color game going on for decades. I have observed queen breeders sort through their colonies (commingled and never kept apart from each other) to find a queen that is either yellow enough or dark enough to serve as the breeder queen for their customers that want Italian (yellow) or Carniolian/Caucasian (dark) queens. Well maybe they will look for some grey queen for their Carniolian customers. My point better be pretty clear by now – queen color and genetic heritage have little to do with each other.

Colony in the side of a house Alice removed. (Photo by A.Howell & A. Rosenthal)

Back in my Starline Program days, Dr. Bud Cale explained to me how one of the inbred lines was developed from a single Carniolian colony found in California (in the 1940s). Cale had the daughters of this queen out-crossed to yellow drones, and then selected for the yellow-est daughters grafted from these daughter queens. In just a few generations Cale had a bee that was essentially a yellow Carniolian, and he used it as one quarter of the Starline hybrid bee and one half of the instrumentally inseminated hybrid Cale 876 (the drone side). Color is pretty easy to select for, and a lot of beekeepers do it.

Back to Alice's queen. Many beekeepers report that the queens and bees found in unmanaged colonies are often dark in color. The general wisdom is that bees and queens in cooler parts of the country are often darker than those in the warmer part of the Continent. This reflects the physiological advantage of being light-colored in a hot sunny climate and the cost of being dark in that same region. But in the North this is reversed – the darker foragers and mating queens and drones are kept warmer by their dark pigment on cooler days. It is an example of localized selection for advantageous characteristics that impact immediate behavior.

Minor temperature differences within the brood area of the hive may influence queen color, with yellow queens being produced when the temperatures are very warm and dark queens being produced when the temperatures are cooler. The heat or cold outside the hive may impact the subtle developmental time of queens and drones in development.

Finally, there is a genetic mutation called the Cordovan gene, that is recessive, but when selected for in a bee breeding program produces a large, nearly all yellow queen and yellow drones. The mutation changes the black bands of the bees to cordovan yellow, and it appears best in a light colored subspecies.

Methods of identification

In my short email reply, I said that it is possible to determine the genetic background of these bees by using DNA samples, or by using features of the wing and other parts of the bee in a process called Morphometrics. This can be quite complicated, making measurements of characteristics like the length of the fore-wing, the width of the fore-wing, the number of hamuli on the wing (these are the tiny hooks that keep the wings together during flights) and the length of the tongue. Except for the number of wing hooks, these characteristics are highly heritable – they are measurable traits that are passed on from one generation to the next. Some European queen breeders base their entire stock on a specific morphometric profile (think of it as a morphological fingerprint), and determine that a colony is or is not a certain stock based on these measurements.

When studied as part of the geographical spread of honey bees around the Earth, these patterns are quite useful to see which subspecies are put into one of four groups: Northwest group (which includes *mellifera, sahariensis, major, iberica* and *intermissa*), the Southwest European group (includes *cecropia, carnica, ligustica, sicula, adami* and *caucasica*), the Middle Eastern group

(*caucasica, cypria, anatoliaca, persia, armenica* and *syriaca*) and the African group (*scutellata, adonsonii, lamarckii, yemenetica, littorea, monticola, unicolor* and *capensis*). This is of interest to all North American beekeepers since we have at least one of each of these four groups represented in the bees that have been or are kept on the continent. *Mellifera* is the called the common black European bee, the English, French or German bee. These bees show behavioral characteristics associated with North African bees – nervous behavior, irritability and considerable use of propolis. These bees are all but gone from North America, but were the first bees brought to the Americas.

Carnica is the bee of the Balkan Peninsula, extending from the Alps and Black Sea into the Ukraine. This subspecies is widely used in agriculture as a honey producer and pollinator. The New World Carniolian is from this bloodline. When saying the name of this race, keep in mind the Latin name: car-ne-ca. Thus Carniolian is said can-ne-o-lan.

Ligustica is the Italian bee, and is closely related to *carnica*. It has a good temper and is able to adapt to a wide range of conditions, making them good for the diverse habits and migratory tendencies of North American beekeepers. It is often credited as the bee that made modern beekeeping possible due to its mild temper, high brood rearing tendency and overall productivity. The other subspecies from the Southwest European group is *caucasica*. These bees have very long tongues and are good at high altitudes. It is gentle and a good honey producer. It uses propolis freely, often blocking the hive entrance, and may be very sensitive to *Nosema*.

Finally, *scutalatta* is the African subspecies in the Americas. It's highly defensive and swarms frequently making it less suitable for commercial beekeepers and unacceptable for urban small-scale colony holders.

In North America we use a simplified morphometric screening to determine if a colony is African or Africanized. Certain of the USDA Bee Labs are set up to screen samples of bees. Only the wings are used, and they are mounted onto microscope slides and the wing's image is projected onto a screen. The different wing vein measurements are then measured, put into a database where they are scored for characteristics typical of African or African-European hybrids.

Developmental differences

Alice asked if bees change colors as they age. If they do not lose their body hairs, the color of a two or three day post emergence bee will be the same when she dies. If the bee becomes a robber bee, and looses her body hairs in the process, she will look quiet different – much darker without the reflective body hairs. There are no robber bees evident in the photograph, reflecting the variation in the drones that mated with the queen.

You want them to be Italian, call them Italian!

As I look at the photo, I will let you call these bees Italian. They are a dominant type of bee in California, and there is a wide range of color patterns from yellow golden leather to rather dark. BC

Queen Rearing Essentials *by Dr. Connor is arriving at your local bee supply companies or can be ordered directly from the Wicwas Press website:* ***www.wicwas.com****. Join Drs. Connor and Dewey Caron for a four-evening Advanced Beekeeping course being offered in Comstock Michigan. Check the website for details.*

Honey Bee Stress Reduction

Ross Conrad

Living organisms can only handle so much biological stress before their systems become overwhelmed and they suffer from diseases, viruses, fungal infections, or all of the above.

Honey Bee Stress Reduction

When it comes to the current plight of the honey bee, the growing consensus and majority of research points to the fact that in general, colonies are under severe stress. This stress has led to the collapse of honey bee hives throughout much of the world, with the United States being especially hard hit. In many cases, the ultimate stressor that leads to the death of a hive is a disease, virus, fungal infection or a mixture of all of the above, as often seems to be the case with CCD. We have to ask ourselves however, what is it that is stressing the immune systems of our bees to the point that they are becoming so vulnerable to these diseases, viruses, and fungal infections?

Bees, like all life forms are constantly exposed to diseases, viruses, and fungi. This is why all living organisms evolve systems of self-defense and immune response that keeps the organism healthy under most conditions. It's when the organism's immune system undergoes stress and is compromised, that immune response starts to fail and diseases get the upper hand. In honey bees, there are many stress-related factors that can have an impact on a hive's immune response.

Some of these stressors such as: abnormally fluctuating weather patterns, environmental pollution, industrial and agricultural chemicals, and the loss of biodiversity tend to be beyond our direct control and influence. However, there are several stressors affecting bees that are within our direct sphere of influence: hive manipulations, dietary stress, honey bee pests, disease levels, and chemical and drug use within the hive. While we work collectively as a society to clean up and stabilize the stressors that are beyond our individual control, each of us needs to focus on the things we can impact directly.

Stress Management

Chemicals and drugs are used in colonies with the rational of reducing stress from pests and diseases. In the process unfortunately, chemicals and drugs can introduce their own form of sub lethal stress on the overall health of the colony. Research has shown that residues from Apistan® and Checkmite+® strips can adversely impact the reproductive capacity of a hive and the longevity of the bees, especially when these residues combine synergistically.

Antibiotics used to control American Foulbrood and Nosema disease are indiscriminate in that they will kill the bad bacteria along with the good bacteria (probiotics) found in the hive. As ongoing research uncovers more and more information on how important a colony's population of beneficial bacteria are to the health of the hive, it's obvious that any actions that reduce hive levels of probiotics are going to negatively affect the immune response of the bees.

Overall, the increased stress that chemicals and drugs introduce into a hive is considered to be less of a concern than the severe stress on the hive from honey bee diseases and pests that the drugs and chemicals seek to control. In many cases, this is true. However, when we are able to keep pests and diseases in check with natural methods without introducing additional stress resulting from chemicals and drugs, we are able to eliminate or reduce all three stress factors at once. For every colony stressor that is reduced, we increase the hive's ability to successfully deal with all the other stress factors that may be straining the colony's immune system.

A Place To Start

As I have noted in past *Bee Culture* articles, the place to begin in our efforts to eliminate hive stress from drugs and chemicals is with the bees themselves. Luckily today we enjoy the commercial availability of several bee strains with varying levels of resistance to *Varroa* mites and some of the diseases honey bees are prone to. These include bees that can trace their genetics to eastern Russia, near Vladivostok along the Pacific Coast (Primorski stock); the survivor stocks from across the United States that were collected and refined by Dr. John Harbo and Dr. Roger Hoopingarner among others known for their *Varroa* Sensitive Hygiene (VSH); and the Minnesota Hygienic stock developed by Dr. Marla Spivak and Gary Reuter of the University of Minnesota. Some bee and queen breeders are also selling survivor stock, bees that are surviving without being treated for mites or diseases. Such bees are able to thrive, even though their exact heritage or survival mechanisms are often unknown.

Previous efforts to move away from bees that produced "too much propolis" in the hive may prove to be misguided. The extremely powerful antibiotic and antiviral properties of propolis are used by the honey bee as an

Using a horizontal strip of foundation to encourage natural comb building in deep hive bodies works well as long as the hive has a large population and the honey flow is strong.

extension of its immune system. I suspect that this is the reason that the honey bee was found through genome mapping to contain far fewer genes dedicated to immune response than other insects whose genomes have been mapped so far. The unique use of propolis throughout the honey bee's history has reduced the need for the bee to develop its body's immune system to the extent required by other insects.

As I have said before, unless you are raising bees for research or bee breeding purposes, purchasing a variety of queen that does not have roots in one or more of these resistant strains does not make much sense to me. When ordering bees, it's a good idea to talk to your bee supplier and find out which race of bee they are propagating and how they manage those bees for mites and diseases. Not only does this educate us about our potential source of bees, but the more demand breeders get from customers for mite and disease resistant stock, the harder they are likely to work to make them available. The ideal bee is one that has such a level of resistance to diseases and pests that they do not require regular treatments to survive.

A weak hive that has an empty deep hive body positioned on top of the colony with only a thin strip of foundation, a bead of wax, or the suggestive shape of the top bar to guide them in comb building, are unable to easily make contact with the top bar as it is some nine inches away from the cluster.

Home Is Where Your Honey Is

Another critical area to consider in efforts to minimize stress on hives is the quality of the wax foundation and combs that are kept inside our hives. Beeswax easily absorbs oil-based substances, and can act like a sponge taking up the numerous chemicals that the bees and beekeeper introduce into the hive. Beeswax can also act as a reservoir for the build-up of honey bee disease organisms in the hive.

Avoiding chemical and disease contaminated wax is easier said than done, especially in your first years of beekeeping. It has been established that just about all the beeswax available commercially and used in foundation, or as a coating for plastic, has some level of chemical residue contamination. As a result any purchased foundation, or frames of drawn-out comb that come with a nucleus colony are likely to contain traces of fluvalinate and coumophos, among other substances.

One way to minimize the level of chemical contaminants in frames of comb and their subsequent sub lethal stress upon the hive, is to only allow beeswax that has not been exposed to toxic mite control chemicals in your hives. Unexposed wax can be used to manufacture your own beeswax foundation, however this can be a very expensive process without the proper equipment and takes a lot of time. If enough clean wax can be obtained, it may be possible to pay a commercial foundation producer to manufacture a custom batch of foundation solely from your wax.

The Natural Comb Option

A simpler solution is to allow the bees to build natural comb while providing them with limited, or no foundation. I have often done this by inserting a two-inch strip of foundation in a frame, instead of a full sheet. Other approaches include: a thin line of melted beeswax along the length and center of the underside of the top bar, a thin piece of wood protruding from the center of the top bar (such as a Popsicle® stick hanging from it's thin side), or a top bar that has its underside cut to form a "V" shape. These all provide some guidance to encourage the bees to attach their comb to the center of the top bar during comb construction. These later measures work best when working with shallow or medium depth supers and hive bodies. This is because the distance between the bottom and top bar in a deep box has a tendency to be too great for all but the strongest, most populous hives to begin drawing comb from the top bar. A weak hive that has an empty deep hive body positioned on top of the colony with only a thin strip of foundation, a bead of wax, or the suggestive shape of the top bar to guide them in comb building, are unable to easily make contact with the top bar as it is some nine inches away from the cluster. In some cases such a hive will begin drawing comb upwards from the bottom bars of the empty frames. Applying a two-inch strip of foundation between the top and bottom bars rather than just along the top bar however, provides a "bridge" to the top bar for the comb building bees.

Because the bees will always build their comb parallel to the force of gravity, special care must be taken to level out hives in which a starter strip of foundation, a bead of wax, or the shape of the top bar is being used to entice the bees to build natural comb within the frame. If the hive is sitting at an angle, the combs built within the frames will stick out in relation to the frame's edges, creating problems during honey extraction and processing. Even when a hive builds natural comb neatly within a frame, the comb will be more fragile than newly drawn-out frames that utilize plastic foundation, or foundation reinforced with wires or support pins. It is advisable in the first year to extract honey from naturally built comb at a much slower speed than is usually used and thus

The faster we can move away from reliance on tactics that introduce additional stress to the hive such as toxic mite controls and antibiotics, the sooner we are likely to see relief.

minimize damage to the combs. Often, by the second or third year, such frames of comb have been built up and reinforced by the bees to the point where they can withstand the rigors of the rotating honey extractor without breaking, cracking, or collapsing.

Living organisms can only handle so much biological stress before their systems become overwhelmed and they suffer from diseases, viruses, fungal infections, or all of the above. Challenges to the hive's immune system are multi-faceted and interconnected. Thus, the solutions to these challenges will have to also be multi-faceted and interconnected in order to be successful in the long run. The ultimate answer to keeping our bees alive lies in keeping the overall stress level of our hives down. The faster we can move away from reliance on tactics that introduce additional stress to the hive such as toxic mite controls and antibiotics, the sooner we are likely to see relief. BC

Ross Conrad, author of Natural Beekeeping, *regularly conducts organic beekeeping workshops, classes and consultations in between taking care of his own bees. Dancing Bee Gardens, P.O. Box 443, Middlebury, VT 05753;* ***www.dancingbeegardens.com; dancingbeegardens@hormail.com.***

Notes From The Almond Conference

What Happens In California Almonds Affects Every Beekeeper, Everywhere

Joe Traynor

The first morning of the Almond Pollination Conference sponsored by the Almond Board was devoted to pollination and was well attended by several hundred almond growers and about 20 beekeepers (including several pollination brokers). Chris Heintz deserves kudos for lining up a stellar program that was educational and informative for all.

Glenn and Wes Card (Merrimack Valley Apiaries, Louisiana, Massachusetts) reprised their August Eastern Apicultural Society presentation and showed the inputs necessary to deliver eight+ frame bee colonies to California almond orchards. Their presentation and accompanying photos displaced the stereotype many in the almond industry have of beekeepers: that they are an aging population, still more focused on honey production and out of touch with the needs of almond growers. The Card's entire operation (20,000+ colonies) revolves around February almond pollination (as do many other U.S. bee operations).

Gloria deGrandi Hoffman (Tucson Bee Lab) unveiled her and co-workers (Ruben Alarcon, Robert Curry, et al) AMOPOL model **http://gears.tucson.ars.ag.gov/almopol/** This program is designed to allow growers to adjust bee inputs (colonies/acre; cost/colony) to orchard layout and weather conditions. It's an ambitious undertaking that will require more data inputs before becoming a reality, as Dr. deGrandi-Hoffman acknowledges: "*When the bloom equations are derived, we will obtain archived foraging activity and nut set data. Actual nut set will be compared with predictions to test their accuracy under a range of orchard and field conditions.*"

Dan Cummings, as a principal in both a large almond operation and a large bee operation (Olivarez Honey Bees) is, like the Hickey character in the O'Neil play "cursed to see all sides of an issue". Dan presented first-hand information about the significantly increased operating expenses on the part of both almond growers and beekeepers (particularly for nosema control and supplemental feeding on the part of beekeepers). Dan (and partners) also broker bees for other beekeepers/growers and said his 2010 bee rental prices will be $10/colony less than in 2009, and that most almond pollination prices will also be lower by about $10/colony. Dan has gradually been cutting back the colonies/acre on his almond orchards by tenths of a colony, with his most recent cut of two-tenths putting him at about 1.8 colonies/acre. Dan is from the Sacramento Valley that historically gets more inclement weather during bloom than the Southern San Joaquin Valley. Many other growers are cutting back on colonies/acre which is contributing to what is apparently an ample supply of bees at this time (we won't know for sure until about the time you are reading this). Dan acknowledged that water shortage problems, particularly on the west side of Fresno County, could have a significant impact on future almond acreage and that winter rainfall this season will be a significant factor.

Dan left enough time for Dennis vanEngelsdorp, at the forefront of CCD issues, to make comments on current bee colony condition. Dennis feels that relatively poor bee forage conditions in the east (Dennis is headquartered at Penn State, a leading bee research institute) and the midwest could well set up bees for a significant die-off this Winter, (Winter officially starts December 21st) one that surpasses that winter of 2007-2008 when colony losses totaled 36% nationwide. Dennis agrees with others that there is no one specific cause of CCD, that it is more like the AIDS in humans; that a weakened immune system sets bees up to succumb to any number of maladies (viruses, nosema and others) and that keeping bees in a good nutritional state helps ward off this AIDS-like problem.

Eric Mussen (like Dennis, not officially on the agenda) also made some good comments about coming up with eight-frame colonies for almonds. The standard for almond pollination in the 1960s and into the 70s was four frames of bees – about what an overwintered colony in the Central Valley would be in February. The standard was gradually ratcheted up to six frames (as bees from Southern California) and now everyone wants eight-frames of bees or better. Eric emphasized that coming up with eight-frame bees requires significantly more expense (especially supplemental feeding expense) on the part of beekeepers than in the "old days" – Eric estimated $200 to $220 to manage a colony for a year now. And, that if you invested that much in your bees and suffered a 50% winter loss, the expense would be $400/colony. Much of these added expenses involve supplemental Fall feeding. If this supplemental feeding is not done it will be extremely difficult to come up with eight-frame colonies in February.

The discussion was then opened up to questions from the audience addressed to Dan, Dennis and Eric, particularly in regard to the bee supply and pollination prices for 2010. Dan made the most trenchant comment here: "*If pollination prices go up [due to a shortage of bees] boxes will come into the state, but boxes won't do you any good.*" BC

Joe Traynor is a pollination broker from Bakersfield, California, and a frequent contributor to these pages.

Doing More With Less

James E. Tew

Or at least doing the same amount with less

A small operation is not necessarily a bad operation.

In recent years, time and time again, I've written about the virtues of the beekeeper who intensively manages a small number of hives rather than minimally manage a larger number of hives. To the feigned amusements of audiences, I have often said that two hives would be plenty for me and that two hives was probably one too many.

For many years in my bee program we routinely had about 200 hives during the Summer months. My program changed and through the years that number dwindled to about 60. Then in 2006, my colony count dropped to less than 40. I have let my colony numbers stay low due to Winter kills rates, my other work responsibilities and to an ever critical labor shortage.

A one-man show

In my bee operation I rarely, rarely have any help. I am a one-man operation. This observation is not unique. Many of you who are reading this spend much of your time alone with your bees. This is a routine characteristic of our passion. I am no role model for what anyone should do in their bee operation. While I am still healthy and reasonably mobile, I am feeling some of the pangs of aging. I no longer have interest in simply flaring off perfectly good energy so I try to be careful with myself. I value my stamina and I mete my energy out in judicious increments.

Only pick up anything I absolutely must pick up.

Beekeepers are notorious for having bad backs. I want hand trucks everywhere and wheels on everything. But in beekeeping, sooner or later, something must be manually moved. Honey is heavy. Processing equipment and hive equipment is cumbersome and heavy. Friends are scarce. Sooner or later, something will have to be picked up.

Mr. E.R.S. from Washington State sent me photos of his one-of-a kind "hired hand." With this device, Mr. S. says he does not have to ask for help. It will be useful for you, the reader, to know that Mr. S. is 90 years old. He and a friend constructed his four-wheel, power-lift hand truck in 1979 and, with some modifications, this unit has been in use ever since. The lifting device is powered by a 12V powered winch. The winch travels up and down the tower as the load is lifted or lowered. By way of cleats on the wooden equipment, supers can be lifted, entire colonies can be lifted or brood nests can be examined.

With the aid of a steel-frame attachment, supers can be weighed. The beeyard will need to be firm and flat and closely mowed. Mr. S built stands to support the hives at the proper height for the loader wheels to roll beneath. As is shown in the photo, Mr. S is also using a trailer for moving and relocating bees.

In the bee world, there are untold numbers of beeyard hand truck designs. Mr. S. appears to have a design that is functional and efficient. I have several photos of hand-winch driven models along with an actual prototype that is exhibited in our bee museum. In rougher terrain, hand trucks need larger wheels and a wider wheel base to prevent tipping when loaded. Additionally, pneumatic tires must be kept tightly aired. Slack tires are spongy and wobbly. In one way or another, hand trucks and trailers are indispensable in many bee operations – including mine.

Work Smarter by Working Slower
• Be over 50 •
• Work alone •
• Have another job •

Keep more colonies in fewer yards.

Through the years, I have recommended that beekeepers spread their hives about the community in small groups in order to maximize honey production. I don't do that now. In fact, I currently have three yards, down from 16 – one just outside my lab door. I don't want to cut grass in multiple yards or spend inordinate amounts of time driving from one yard to another. I hope to be able to maximize my time and energy more than maximize my honey crop.

Standardize everything on the hives.

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

No, I don't think plastic frames are better, but they require no assembly; hence no labor. They twist easily and don't repair well. I suggest that you recycle them rather than toss them in the trash. Never burn them. They really smell when burned.

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

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

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

Aside from wood repair, I have no problem with old stuff so long as it is dependable, heavy-duty and usable. So I drive a terrible looking old truck with a lift gate. I use a 1983 John Deere lawn tractor to keep the grass knocked down in the two primary yards. As I write, I realize that nearly all of my equipment is old – extractors, uncappers, honey pumps, hive equipment, trucks, and me – all showing some age. Nothing wrong with that.

My labor shortage.

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

Maintenance is always an issue and keeping my storage area clean is a never-ending task. When I am once again a young man, I have the best intentions for cleaning and organizing this area. You just wait.

An above average honey crop. Is this good news or bad?

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

Working smarter by working slower.

How can *"working smarter by working slower"* make sense? To comprehend this comment, first, you should be over 50 years old. Second, you should be doing all the work yourself. Third, have additional job demands other than honey processing that forces you to work at the extracting process in fits and starts. My way of coping with these characteristics has been to only bring in the number of supers that I can process in about one-half day rather than working for several days to bring the entire crop in. For me, about 20 or so supers, depending on their weight is a pretty good half day's work. I don't want to have unprocessed supers sitting around, leaking honey and encouraging small hive beetles. Then, after extracting, I don't want large numbers of uncapped supers to haul back to be put away. I ask you to remember that I have other responsibilities that should not be long ignored.

In the yard

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

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

In the extracting room. To continue my "working slower" concept, I also use smaller processing equip-

ment. Since I am only bringing in a small number of supers at the time, I don't want to fire off my larger processing equipment. It takes about 20 gallons of honey to prime my larger cappings tank and to fill the pump and the honey lines. I don't want this machinery filled with honey sitting around unused for days at a time. If I processed all of these supers during one work session, it would be logical to use the larger equipment, but since I am processing about 20 supers at a time, I am actually processing honey at the hobby beekeeper level. By using smaller processing equipment, I make my extracting line simpler and easier to clean after each extracting session.

Messy or efficient?

Last Fall, I put the extracted supers back on the colonies to entice the bees to clean up the loose honey. I'm leaving some of the supers on all Winter. Sounds messy and looks weird to passing beekeepers. Empty supers on top of a colony are reasonably easy to blow off during Winter storms. I know they should be put away, but it's more work and it they don't blow off, they are in place for next Spring. I need to look at everything I'm doing to be sure that it really needs to be done. I don't need to busy-work myself. I'm clearly making this process up as I go along. BC

I look at everything I'm doing. I don't need to 'busy-work' myself to death.

*Dr. James E. Tew, State Specialist, Beekeeping, The Ohio State University, Wooster, OH 44691, 330.263.3684; **Tew.1@osu.edu**; **http://beelab.osu.edu/**.*

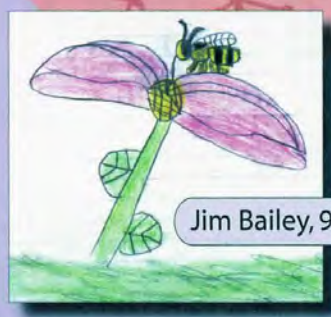
All The Buzzz in...

I'm reading loads of books these days. Create a bookmark and send it my way.

I drew this picture because it reminded me of my dad's beehives and how I first got stung.

Jenna Sergent, 8, WV

Abby Overby, 7, MN



Jim Bailey, 9, OH

Alarie, 8, MN

Cool Tricks for Cool Weather

When you are cold you can put on your long underwear, sit next to a fire and drink hot chocolate. Unfortunately bees don't have long underwear to warm them up.

How do bees survive the winter?

The Cuddle Huddle or Having a Ball

If you are watching a parade outside in the winter, huddling with your family and friends can help to keep you warm. A colony of bees group together to stay warm too. They snuggy down into a small ball when the temperature outside gets down to the mid 50's - the lower the temperature, the tighter the ball.

The temperature inside this ball of bees can be a comfy 65°-86°. The bees take turns being on the outside where it is the coldest and closer to the honey. That way they all have a better chance of surviving. The bees can sometimes die because they can't leave the cluster to get honey.

Work Out Time

Running in place can help to warm you up. Bees don't run but they do exercise. If you put your ear to the hive you can hear a low buzzing sound. No, they are not snoring, humming, or flying around. They vibrate their flight muscles to create heat and warm the hive. The wings do not move in the process.

Some beekeepers in the northern United States and Canada wrap their beehives for added protection.

Honey to Eat

Bees need honey to eat all winter long until the plants bloom in the spring. Starvation is more of a threat to the bees than the cold. If they die in the winter it is often because they ran out of food or they couldn't reach the honey in their hive.

In the north where the temperatures are colder, honey bees need around 100 pounds of honey to survive. Sometimes beekeepers need to feed the bees.

Answers: From biggest to smallest- 52°, 46°, 32°, 19°, 7°, -15°

... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
February 2010

Isabelle Cooper, 8, AZ

Bee Mine

Make your own valentines. Paula Gentry sent this photo of Hannah, a two-year-old basset hound from Woodland, CA. We've made this photo into a Valentine.

Some other ideas for captions:

No bones about it.
Bee My Valentine.

Bee My Valentine.
Fleas? Pretty fleas?

Don't bark up the wrong tree.
Bee Mine.

Cold Cluster Match

Match the outside temperature with the size of the clustered bees. Hint: The colder the temperature the tighter the bees huddle together.

7° F
52° F
-15° F
19° F
32° F
46° F

Pollination Power

National Pollinator Week is June 21-27. Start planning a pollination event in your community. For more ideas on how you can be involved go to www.pollinator.org.

Great Sunflower Project

Be a part of this fun, informal science project. Watch and record bees on sunflowers then share your data. For more information on this project and to receive free sunflower seeds go to www.greatsunflower.org.

Bitty Bee Buddy

Krista Ann Laubacker became a bee buddy at just 5 days old. She has the honor of being our youngest member. She lives in western New York with her loving mommy and daddy (Kevin and Michelle Laubacker).

Krista loves to bounce and listen to music. She especially loves cuddling with her daddy after dinner. Her Grandpa Seames is a hobby beekeeper. Welcome to this world tiny Krista!

Beecome a Bee Buddy

Send two self addressed stamped envelopes and the following information to: Bee Buddies, PO Box 2743, Austin, TX 78768. We will send you a membership card, a prize and a birthday surprise!

Name: _____

Address: _____

City, State, Zip Code _____

Age: _____ Birthday: _____

E-mail (optional) _____

Send all questions, photos and artwork to:
beebuddies@hotmail.com or mail to the above address.

Jennifer Berry . . . Queen Producer

Kim Flottum

You may already be familiar with Jennifer Berry from reading her articles on these pages over the past couple of years or so. But she has other skills. She is the Research Associate at the University of Georgia Honey Bee Lab, working with Dr. Keith Delaplane. There she manages the lab's colonies and nucs . . . depending on the season and year, anywhere from 100 to a couple hundred. These are used in all manner of research projects . . . from studying the effects of small cell foundation on varroa populations to pollination efficiency studies to the cumulative effects of a witch's brew of pesticides that may be found in beehives. Raising queens, breeding queens and just having enough bees to make some honey and support the projects of the lab are also needed reasons to have bees. After all, it's a bee lab.

She is also a popular speaker and travels extensively to meet with beekeepers. This is part of her Extension role at the lab. Her articles help in that regard also, but they aren't in every month because sometimes her other responsibilities get the bulk of her time. She has eclectic tastes in the world of bees, and, as much as her editor allows, often wanders from her role as the voice of southern beekeeping.

But Jennifer has goals other than caring for bees for her research and that of students and the lab. A couple years ago she began raising queens for sale. She uses her own colonies on nights and weekends when away from work. Not thousands of queens mind you, but hundreds, and if you've raised any queens of your own you well know the time and trouble it takes to do a good job. Her queens are sold through the Brushy Mountain catalog during the appropriate season following a fairly firm schedule, and they are also in the nucs she sells in the Spring. Because there aren't thousands of queens to sell they can be difficult to get. If you're interested, get in line . . . and it's a long line. Brushy Mountain customer service people take orders (and kindly field as many questions as they can answer) and will put you on the list for the next available shipment, which may not be the next shipment because that flock of queens may already be spoken for. There's no rushing this schedule. Don't even try. So as a result Jennifer doesn't even try to make your schedule . . . she simply can't with the limitations on time and colonies. But if your schedule and hers mesh, and you get your order in on time, you'll get a queen when she says you will.

Jennifer also uses her colonies to make honey and moves some of them from their Athens area locations north to a location for sourwood honey. She also moves them south in late Fall, early Winter to get a jump on the season and buildup for nuc production.

As for breeder stock...they tend toward survivors. Over the past decade she has chosen her own stock, and carefully chosen and screened stock from others who have been choosing for this same elusive attribute. There's some Russian, Italian, Carniolan, hygienic and mongrels mixed in. As a result the queens

A Cloake board unit. The queen excluder is permanently in place, and the sheet of tin that separates the top and bottom slides in above the excluder.

Cloake board in place. The top box has an entrance above the tin sheet, while the bottom box has been turned 180° and the entrance closed.

Five-frame and three-way mating nucs.

Cell bars removed from the finisher colony.

tend to vary a bit in appearance . . . sometimes dark, sometimes what she calls dusky, some lightish and some quite Italian in appearance. Looks don't make a queen in this operation though, it's her performance that counts, first, last and inbetween. There's a long list of qualifications one of her queens has to pass before it gets to you, and even longer before it becomes a breeder for the next generation of queens to be produced. That's one of the reasons there aren't thousands to sell, and it takes time to get to you.

There's one part time assistant in this operation . . . Bob Luckey, who helps out on weekends when a lot of the work gets done. And a few friends help out when needed . . . beekeepers who know bees, and friends who can paint and assemble and haul equipment when needed. This is why I decided to look at how these queens come to be because it's a little different than most operations.

Though these queens get an early season boost by being in southern Georgia early in the year, it still takes a long time to go from graft to post office. That's because of the investment in quality control that goes into these queens. Each goes through a whole series of inspections before they are shipped that begins with the size and shape of the queen cell that comes out of the finishing colony and then goes into the mating nuc. During the more than 35 days she spends in the mating nuc she gets checked to make sure she's mated, then laying, that the brood pattern is not adequate but excellent, that the balance of brood is correct that is there is a steady increase in brood production from day one to the day she is removed. During this inspection period if there's a reason to remove her from the colony there's no hesitation to do so . . . no mercy for a queen that lays poorly, or just isn't cutting it. She's history.

Finally, more than 35 days after she enters the mating nuc she's ready to be packaged and sent out. One final measurement is the quality of the bees that that queen produces, the final quantity and quality of the brood pattern she produces, and the temperament and disease resistance of the now mature workers she produces.

Jennifer starts the process of this year's queens several years prior, selecting breeders for this year that have already been tested before going into production. Of course they pass the hygienic hurdle and brood production and producing disease resistant offspring . . . that's a given. They have to be tolerant of being worked . . . gentle you might call it . . . but also not runny on the comb or in the box, and not flighty when the cover's removed. A major concern is that these bees should be easy to

Queen cells are introduced a day or so before the queen is to emerge.

Look carefully for errant queen cells – sometimes they are on the side of the box.

One of the mating yards.

work, and tolerant or resistant to the major problems bees have.

Hygienic behavior keeps foulbrood in check, and her annual inspections by the Georgia Department Of Ag prove that out. That behavior also keeps out anything resembling chalk . . . that and serious weeding if it shows up with any of the breeders she chooses. Tracheal mites sometimes are found, but never in numbers great enough to do harm, and very often not at all . . . probably a benefit of the Russian blood in the mix. But *Varroa* . . . there's the kicker.

The survivor stock used has, for the most part, been through the live and let die routine that other breeders have endured. Thus this stock, especially when mixed with some Russian tends to have very few problems with *Varroa.* The counts remain low, but not zero in the production stock she sells, and very nearly zero in the breeders she keeps selecting. But any *Varroa* are too many when it comes to the problems they bring with them, so as mating nucs are assembled in the Spring, they are dusted with powdered sugar in the Spring, and again after brood production stops in the Fall.

This takes away the Pure Survivor stock label but keeps the bees mostly free from mites, and totally free from any other miticide or antibiotic exposure. And that's important. Recent research shows that exposure to almost any foreign compound in a hive begins to stress the bees exposed, and stressed bees aren't healthy bees. And that's the goal. But then, Jennifer is careful about mite resistant claims yet. She hasn't been in the business long enough to establish that link, but the bees she has now, and the direction they appear to be going is promising.

Another factor that adds to the health of the queens she sells, and the rest of the bees in her operation is that, as stated, no colonies are ever treated with any chemical . . . miticide or antibiotic . . . but just as importantly, the beeswax in the hive is not reprocessed from outside sources. She begins with clean plastic foundation...no beeswax added . . . and lets the bees draw from that. The inside of these hives is as chemical free as they can possibly be.

Each queen begins her journey as an egg laid by one of the breeders chosen for performance on the attributes mentioned. Then this breeder has to survive the Winter . . . granted, it's a Georgia Winter, but a Winter never-the-less. When drones are abundant in the drone colonies . . . each mating yard has a nearby drone yard . . . it's time to graft from these successfully overwintered and healthy breeder queens.

Cells are single grafted, she figures 100 cells will ultimately produce 60 queens, and one or two bars with 19 cells each are put in a Cloake style starter finisher. The number of cells is determined by the strength of the colony, and more importantly the weather. The Cloake colonies are set up as a two-deep unit with a Cloake board between . . . which has both a queen excluder and a removeable sheet of tin that can be slid in and out placed between two deeps a few days before the bars are added. The sheet of tin effectively separates the two boxes both physically, and in terms of odor. The bottom box is turned 180°, and the entrance is closed, requiring

A nearby drone yard.

A good pattern is one criteria for a breeder.

Dusting a colony with powdered sugar.

that all bees must enter the top.

Open brood, or milk brood as it is sometimes called, is added to the top, along with frames of open honey and pollen. The day prior to the cells being added to the top super, the tin sheet is inserted, separating the two deeps and essentially creating two colonies . . . the top with lots of young bees and no queen, and the bottom with far fewer bees and the queen. When the cells are added the next day to the top box the open brood is removed and all those bees have nothing to do but take care of the cells, having lots of food close at hand to help. After twenty four hours the tin sheet is removed, restoring the two boxes to a single queenright colony, but the excluder remains in place . . . keeping the queen below from killing the cells above.

On day 10, just before the queens are ready to emerge the cells are removed and the colony reset for another batch. The cells are placed in an incubator, surrounded by protective cages, and made ready to move to the mating nucs.

Jennifer uses two styles of mating nucs. She has five framers, and she has three-way nucs . . . that is, a 10 fame deep is divided into three, three frame compartments, each with its own entrance. Mating yards are set up in several locations, each near a drone yard so she has very good, if not perfect control of who these virgins are mating with because drone mothers heading up the drone colonies are chosen with as vigorous selection as the breeder queens.

Queens are usually removed on Sundays, new cells introduced on Mondays. Colonies that do not accept cells, or destroy queens after introduction are taken out of the production cycle until the resident workers are gone. By waiting a day, however, she gets nearly 100% acceptance.

Once accepted, these new queens take a few days to get mated and then to start laying. She's checked after a week to make sure she didn't disappear during a mating flight and the bees are taking care of her. Then, it's wait another three plus weeks to see how her brood pattern and amount turn out. She remains in that mating nuc until her first flush of brood can be evaluated for temperament, behavior and obvious signs of other problems. It takes nearly 50 days from egg to mailing to make sure everything is working, and the queens being produced are good enough.

Once a salable queen is harvested from a nuc, she is caged right in the field, returned home and along with 19 other queens for that week's shipment put in the mail.

This season will be shorter than last year's because of a scheduled move and building project that will take up lots of time . . . and it's either get a roof on the new digs, or get bees out, and without a roof, no bees will be getting out. So if you are interested in obtaining some of these, call early and get on the list . . . and it still might not work this year. But it will for next year, and from what I've seen, they are worth the wait. BC

Kim Flottum is the Editor of Bee Culture *and author of the newly revised book,* Backyard Beekeeper.

ONTARIO BEEKEEPERS ASSOCIATION
TECH TRANSFER TEAM
Meet The Bee Girls!

Tom O'Brien

The Bee Girls of Ontario is the synonym of the Technology Transfer Team (TTT) that is operated by the Ontario Beekeepers Association.

Throughout Ontario beekeeping associations they are held in high esteem. As an example, early last Spring a newcomer to beekeeping pestered his Hive Inspector with all kinds of questions. The time stressed inspector had had enough and wheeled around and faced the rookie. "Look," he said to the startled one, "just get in touch with the Bee Girls of the Tech Transfer Team and they will answer all your questions. OK?"

The TTT, operating under the Technology Transfer Program, was established in the early 1990s and has the unconditional support of beekeepers throughout Ontario. Dr. Medhat Nasr was its earliest "big name" collaborator. He is renowned for his Apiculture research work while at the University of Guelph and continues researching now for the Government of Alberta. The program today operates under the watchful and encouraging presence of Dr. Ernesto Guzman-Novoa, Apiculture Research, University of Guelph.

Janet Tam, Melanie Kempers and Alison Van Alten – Tech Transfer Team.

Alison Van Alten, Technology Transfer Specialist, who holds a Masters Degree in Biology (2000) from the nearby University of Guelph, is the Team Leader, and was asked to describe the team's work in her own words. "We are a unique hands-on team working for and with the Beekeepers of Ontario, Canada. We respond to current issues in the industry and we are contract employees of the Ontario Beekeepers Association."

It is not uncommon for Ms. Van Alten and her mates to answer questions (no charge) from beekeepers, via phone or email, from various parts of Canada and The United States.

The Team maintains three yards of beehives near Guelph Ontario with a total of 100 hives. (Somehow Ms. Van Alten finds the time to maintain 80 hives of her own and said, with tongue in cheek, "Yes, I too am a hobby beekeeper!")

SATISFACTION

All three team members were asked what their greatest satisfaction had been so far while being a Bee Girl of Ontario. Without hesitation, Ms. Van Alten replied, "Just seeing the satisfaction on the faces of so many beekeepers is a great thrill to all of us," and as colleagues Janet Tam and Melanie Kempers nodded their approval, Ms. Van Alten added, "We have a good working environment here and our team is very professional."

The Bee Girls' work falls under three principal categories.

HONEY BEE DISEASE CONTROL

The treatments involving chemical compounds for disease control are those that are approved by the Ontario Government.

The issue that is now currently under their intense study is, of course, the *Varroa* mite. Said Ms. Van Alten while taking a mid afternoon break, "We look at potential treatment options and always study for efficacy (how well a treatment works) along with the side effect(s) the treatment has on the bees. Also, we are quite concerned for the safety of the honey producer along with those who buy the product."

The year 2006 marked the last time any of the team saw an infestation of Trachael Mites.

Apivar (3.33% Amitraz) strips have been approved for the control of *Varroa* mites in Ontario until June 30, 2010. Beekeepers are urged to remove honey supers while using Apivar strips (2) that are placed in brood chambers for no longer than 56 days (42 days recommended.) More Apivar information at **http://cba.stonehavenlife.com/2009/07/conditions-instructions-apivar-emergency-use-in-bee-hives/**

OMAFRA disease control recommendations are

We provide training, inspections, and lab testing procedures.

found at **http://techtransfer.ontariobee.com/index.php?action=display&cat=52&v=76**

EDUCATION PROGRAM

Melanie Kempers milked many cows on her family's dairy farm before studying Agriculture at the University of Guelph. In 2006, Apiculture took hold of her and after a short apprenticeship Ms Kempers became a full time Bee Girl with the rank of Tech Transfer Technician.

"We Bee Girls travel to various points in Ontario where we produce Educational workshops involving Introductory Beekeeping or Integrated Pest Management or Introductory Queen Rearing. Such meetings usually involve Beekeeper Associations and there are more than twenty which are active in the Province," she said while adding later that more than nine such workshops were given during six weekends in May and June of 2009. There must be at least 20 "beekers" attending each workshop to pay the expenses.

One of their Spring time presentations occurred on Prince Edward Island. Beekeeper organizations in Western New York have shown some interest in hosting them. The cost is $110 for non members of the Ontario Beekeepers Association and each participant receives either an IPM or Queen Rearing manual.

A Mite Scouting Program was recently introduced whereby the beekeeper pays the Bee Girls to take samples of bees from various hives in order to test for various diseases including AFB, EFB, and Nosema. The individual hive costs are $2.00 for *Varroa* Mites, $2.50 for Tracheal Mites, and $8.00 for Nosema.

QUEEN BREEDING PROGRAM

Beekeepers today are faced with diseases and conditions that were unheard only a few years ago. The strengths of *Varroa* mites alone would never have been previously imagined and subsequently many in the honey producing industry believe that a hive with a strong and vigorous queen with a multitude of worker bees is the only salvation.

Such was a belief back in 1992 when the Bee Breeding Program was instituted under the Ontario Beekeepers Association and supported by the Ontario Ministry of Agriculture, Food, and Rural Affairs. Breeding for resistance was, and still is, the principal focus of the program.

To put it in the simplest context, the beekeeper selects the stock to be used from his/her hives and maintains control over the drone and queen cell producing lines. From that point on the beekeeper follows a regimen involving hard work, persistence to minute detailing, and financial input to name only a few.

After selections are made, the Bee Girls assist the breeder by visiting the yards in July and August. Hygienic tests are performed on colonies regards mite disease/resistance. Queens from those showing hygienic behavior and resistance are then used as breeders. The Bee Girls analyse those queens chosen by the breeder for breeding suitability and overall health.

THE BREEDING TESTS CONDUCTED CONSIST OF THE FOLLOWING GUIDELINES

1) Maintenance of the Hygienic Trait in Ontario Bee Stocks ... the frames are tested whether the bees are (1) opening the cells with infected embryos and (2) removing of same. Liquid Nitrogen is used in the bioassay. Colonies are ranked in two categories: those that clean out 75 percent or more and those with a score between 50 and 75 percent. Only those in either category are recommended for breeding.

2) Health Status of Colonies Tested in the Breeding program ... samples consisting of 150 bees and more (and stored in alcohol) are taken from hives. The Bee Girls then test for *Varroa* and Tracheal mites along with nosema. The breeders are then in a position to alter or maintain their hive management procedures.

3) Survey of the Quality of Honey Bee Queens from Ontario Breeders ... mated queens with some attendants are received from participating breeders. The queens are examined for *Varroa* and Tracheal mites, and Nosema spores. An estimate is made of the sperm stored in the spermatheca. With such results the beekeeper can better judge the queens to be used for it is a known fact that superlative queens are normally better accepted by a hive population and those that are ill, maimed, or in poor health, and thus are soon superseded.

4) Maintenance of Trachael Mite Resistant Honey Bee Stocks ... this bioassay is considered a routine part of Ontario beekeepers yearly routine. Breeders submit frames of emerging brood for tracheal mite resistance testing. Tagged bees are introduced into tracheal mite infested colonies and are subsequently retrieved. They are then dissected and a count is made of the migratory female mites that are found in the tracheae. A result is then calculated for each tested hive.

Integrated Pest Management

Under the above, various studies were recently completed by the team. Costs were covered by the source named in brackets.

(AAC Agricultural Adaptation Council)

Cost of Production Study (OMAFRA Special Fund)

Mid-Season "Flash" Formic Acid Treatment Trial (OMAFRA Special Fund)

Honey Bee Mite Scouting (TTP)

Nosema Treatment Trial/Provincial Nosema Survey (OMAFRA Special Fund)

Alternative Fumagilin-B Applications (TTP)

Organic Beekeeping Practices (AAC)

Resistance Testing (TTP)

Queen Promotion Trial (OMAFRA Special Fund)

Timing of Treatment Application Trial (OMAFRA Special Fund)

Monitoring Regimes for Honey Bee Colony Health in Response to High Winter Losses in Ontario (AAC)

Maintaining Food Safety in the Honey Bee Industry

Environmental Contaminants (AAC)

Progressive Training and Information Program for

Beekeepers

Introductory Beekeeping, IPM and Queen Rearing Workshops (TTP)

BEE GIRLS-TEAM OPERATING COSTS

Funding for this unique resource comes from several sources. Tim Greer, OBA President said that the team received $85,000 in 2009 from the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA), and that the Agricultural Adaptation Council of the Ontario Government was and is a source of funds. The third source was a yearly donation of $20 – 23,000 from members of the Ontario Beekeepers Association. It was not made clear whether that money was "out of pocket" donations from individual members or from membership dues that range upwards from $85 per year for non-voting members.

Further, from 2006 to 2008 the project "Advancing Standard for the Ontario Apiculture Industry" received $110,000 (Cdn) from the Agriculture Adaptation Council - CanAdvance program.

In 2007 the AAC - CanAdvance program forwarded $26,000 to the TTT for a study about "Monitoring Regimes for Honey Bee Colony Health in Response to High Winter Losses in Ontario." The total cost of the venture was $31,000

OBA's Bee Breeding Program is an integral part of the Bee Girls' responsibility.

The team is head-quartered in Orchard Park on a six hundred acre estate owned by the Jesuit Fathers on the outskirts of Guelph Ontario.

Bee Girl calendars hang in the kitchens and offices of many Ontario beekeepers. The 2010 model, which is loaded with pictures and beekeeping information, may be ordered using **obatechtransfer@rogers.com**. BC

Tom O'Brien is a beekeeper, freelance writer and retired High School Science teacher who lives on a farm near Mattawa, Ontario. He can be contacted at ***tmobrien1@sympatico.ca****.*

Climate Change, Nectar Flows, NASA, And You

Jennifer Berry

You can play an important role in measuring Climate Change and Nectar Flows – Here's How.

Just a few years ago the Southeast was experiencing the worst drought in more than a century. Lakes, which supplied water to nearby towns and cities were losing water so rapidly that fears about available drinking water in the near future began to surface. Strict rations and bans on outdoor watering became mandate around the state. Homeowners watched as their newly planted lawns, gardens and shrubbery turned brown and withered. Nurseries hit with restricted water use, and the inability to move vegetative stock (since nobody was planting), closed their doors forever. Car washes, swimming pools, and water parks were forced to turn the water off. Farmers watched as their crops wilted and died and the ground dried and cracked and blew away. Local and state governments started panicking when it became obvious that the taps would soon run dry. Even lawsuits erupted over which states had access to water usage from two river basins – the Alabama-Coosa-Tallapoosa and the Apalachicola-Chattahoochee-Flint.

Now let's fast-forward two years into the future. What do we see – the southeast experiencing record rainfall. Below are rainfall totals for 1999-2009. These amounts were recorded in Peachtree City, Georgia, south of Atlanta. The 2009 totals, which don't include a total for December, are double that which fell in 2007. Yet, so far this December we have already surpassed our monthly average of 3.71 inches of rain. Hopefully, 2010 will be a Goldilocks' year and be just right.

Year	Rainfall Totals (inches) (Peachtree City, Ga)
1999	38.86
2000	35.56
2001	38.40
2002	47.82
2003	52.90
2004	53.60
2005	56.43
2006	48.46
2007	**31.85**
2008	41.43
2009	**62.33**

With all this torrential rain, come swollen creeks, over-flowing rivers and streams. What used to be a dry creek bed one day can become a raging torrent of water the next. If you are at all concerned, check your hives. Several beekeepers were taken by surprise this year when a non-threatening stream quickly turned into what resembled the Mississippi river and in a matter of seconds years of hard work were swept down stream. One in particular, Bob Brachman, a Russian queen producer, lost a significant number of breeder colonies when an unusual August thunderstorm dumped inches of rain in a few short hours.

So is all this due to normal climatic changes or global warming? A recent study from Columbia University examined the 2005-2007 drought that brought the south to its knees and concluded that it was not global warming but instead population growth that ran the lakes dry. Between 1990 and 2007 Georgia's population increased by 3.06 million people but the water supply or storage capacity had not kept up with the growth. Therefore, the severe water shortages were a result of over population more than changing rainfall patterns.

Now, regardless of your stance on global warming (whether you're a card carrying environmentalist, global warming supporter or a Limbaugh-Hannity following, global warming basher), the earth is experiencing worldwide climate changes. For example, the 20th century was the hottest century for the past 400 years. And at this point the Arctic is experiencing some of the most dramatic affects. But these pages are not

P. Lefebvre photo

T. Wilson photo

intended to discuss the facts or fictions of global warming, but instead to visit how climate change may be altering our beekeeping calendar. Currently, Dr. Wayne Esaias, a NASA scientist, is heading a research project exploring this issue.

Since 1979 Dr. Esaias has worked for NASA as a biological oceanographer at the Goddard Space Flight Center in Maryland. His earlier work examined the abundance and occurrence of phytoplankton in the oceans and how this related to climatic systems. In 1992, Dr. Esaias became a beekeeper when his son's Boy Scout leader had to find a new home for several hives (and a scale). At first Dr. Esaias was a bit wary of any kind of bee since he had once been hospitalized due to an allergic reaction after being stung multiple times by ground hornets. But once the bees arrived they quickly settled in and became part of the family routine. The colonies produced surplus honey, which was sold, plus they were perfect candidates for upcoming 4-H projects. For Dr. Esaias, the bees became a welcomed relief from his day-to-day schedule.

But soon the beekeeping successes departed and the colonies started to wane. Numerous swarms produced weakened colonies, which eventually perished. Blaming himself for being a bad beekeeper, Dr. Esaias couldn't get a handle on what he was doing wrong. Had he not read every book he could get his hands on about bees and beekeeping? Hence he began to think outside the box and started exploring other causes. That particular season in Maryland had been much warmer and wetter than normal which was typical of an El Nino year (unusually warm ocean temperatures in the Equatorial Pacific). The bees, which were not behaving in their usual manner, were reacting to the climatic changes brought on by this El Nino. Warm, wet Springs (precursors to earlier nectar flows) can trigger colonies to swarm sooner and more often.

Then an idea came to his mind. How can honey bees be utilized as climate data collectors? Bees are already excellent environmental samplers so one just needs to tap in on this tremendous resource. They're already doing the work for us. But how??? Then it dawned on him: scale hives! By weighing colonies each day (which are continually sitting on an industrial scale) these individual data points over time can quantify the amount and pinpoint the exact timing and duration of nectar flows. Scale hive data. But the bigger picture here is this: how does this tie into climate change? Because of his question, two years ago Dr. Esaias made the transition from sea to land in order to investigate a possible correlation between nectar flows and climate change. He wrote a grant, was funded by NASA and has since been trying to put the pieces together.

One of NASA's primary functions/objectives for earth sciences is to understand how climate change impacts our home planet. There's the physical climate, such as temperature and rainfall, which is simply measured over time. So far the data shows that significant changes are occurring. Yet, how do these physical changes impact the earth or more specifically ecosystems? And going one-step further how do these changes affect plant/pollinator interaction? Then the bottom line of course: how does this affect humans on the planet?

Being a NASA employee Dr. Esaias has resources available to him. Because his question is sought to unravel something so complex, he felt that large-scale satellite data would be needed to help. There are just too many plants, too many pollinators, too many different ecosystems all interacting and not enough hours available in someone's lifetime to explore each one.

So how is all this data collected, correlated, crunched, analyzed and then understood? Let's start by looking to the skies. Sensors, such as MODIS (Moderate Resolution Imaging Spectro Radiometer) located on NASA's Aqua and Terra satellites, are continually snapping detailed images of the planet. Because of the rotation of the earth, within eight days (some areas may be under cloud cover) an entire image of the earth's surface is available. Overtime these recorded images show the earth "greening up" (when the earth wakes up from its long winter slumber and vegetation begins to sprout new leaves) and then "browning down" (when vegetation looses its leaves). Dr. Esaias takes these space satellite images of the earth's greening and compares them with the nectar flow data collected from the scale hives. They corresponded nearly perfectly. But recently something unusual was detected; it seems the Northern US is "greening up" a half a day earlier each year. "In total, since the 1970s, the nectar flow also has moved forward by about one month in Maryland" says Esaias.

Unable to be everywhere each day, Dr. Esaias has conscripted a network of citizen-scientist-beekeepers across the country who volunteer their time to collect hive weights. At this point, there are 87 data collection sites, mainly concentrated in the state of Maryland, though there are also sites scattered across 20 other states. The south and west, however, is especially void of these experimental sites. The data is sent to Dr Esaias through a web site set up specifically for this project: HoneyBeeNet (honeybeenet.gsfc.nasa.gov). As the data flows in scientists are able to better understand how climate is affecting the dynamics of incoming nectar overtime. And beekeepers get a better picture of what is happening in their apiary.

So how does this information help me, the beekeeper?

By placing colonies on a scale and weighing them each day, data records the ebbs and flows of the season. A rapid increase in hive weight indicates nectar intake, a steady decrease in weight indicates a nectar dearth, hence a colony loses weight as food stores are being depleted. So far the most weight Dr. Esaias has seen a colony gain in one day is 25 pounds in Maryland. As a

colony gains weight brood is being reared, comb drawn out, and honey stored. But something else may be happening as well. Colonies may be preparing to swarm. If all of a sudden a colony loses over three pounds in a day something has obviously happened: a swarm perhaps? Most beekeepers aren't aware that their colony has swarmed, but with this sort of data it would help reduce the amount of time the colony is queenless. This kind of data is a great help in hive management.

Such data could also help us forecast when or if Africanized honey bees (AHBs) will be encroaching upon an area. At this point, theoretical models, which are too unstable and unpredictable, project AHBs advancing all the way to Canada. But based on climate and vegetation patterns are these northern areas suitable for AHBs? There are two factors largely responsible for keeping AHBs contained to the western part of the U.S. and Florida: temperature and food availability. For instance, when AHBs crossed the border into Texas they headed north then tracked west ending up in California. They did make a small presense in the Western portion of Louisiana, but didn't venture any farther east. The most likely reason: no fall nectar flow. From east Texas to Georgia plants and nectar flows are dramatically different. However, Florida and Arizona both have Fall nectar flows, which resemble nectar flows in Africa. Scale hive data in the gulf states would give us a better knowledge of nectar flows which might tell us whether AHBs could survive there.

This data will also be beneficial to commercial beekeepers. A certain percentage of commercial beekeepers move colonies to follow nectar flows. They may be moving south for the Winter to take advantage of early blooming crops or north to the Dakotas for clover. With climate change comes a whole host of issues, which impacts blooming dates, which in turn affects nectar flows. They may come earlier or later. They may be more or less productive. With this information at hand, areas predicted to be less productive could be avoided while more productive areas can be accessed. It could also help beekeepers know when they should be feeding to avert colony starvation. Overtime such data would provide a more reliable idea of when to expect a nectar flow in a given area. It could help us predict good years, or bad years and on a larger scale, agriculturally speaking, it could predict possible times of crop failure leading to famines.

But????? Wouldn't it be beneficial for the bees if Winters were warmer and nectar flows earlier? Perhaps, but lets explore the downside to this. If plants are blooming earlier each year, will the pollinators be able to keep up with this forward motion or will they fall out of sync with the plants? Overtime pollinators and plants have become in sync with one another since they both rely on the other for survival. Most plants need pollination in order to produce seeds and they accomplish this by luring the pollinator in with nectar. Both benefit and both survive. But, if plants bloom too early when the pollinators aren't there, the plants lose the benefit of pollination and when the pollinators finally do arrive the flowers are no longer in bloom and they lose the nectar. Hence, system failure. Another thought, earlier flows could mean longer times an area experiences a summer dearth (areas that see summer dearths). The bees eat more than usual because the temperatures are still warm, but nothing is coming in the front door. By the end of Summer, early Fall, when colonies should still have plenty of stores, colonies are starving when they should be beginning to raise Winter bees. Not good for overwinter survival.

As climate changes, how are our bees/pollinators coping with these shifts? Scale hive data is focusing in on the timing of this pollinator/plant interaction, which to a degree has never been explored before. This data gives us a picture so that we may be better prepared in the future. Climate prediction models don't include blooming dates and how they relate to nectar yields as a function of climate. As climate change continues ranges will shift. First the most obvious is when the nectar flow begins and ends. With this information scientists can extrapolate when the nectar flows are occurring across the nation in accordance with the wall-to-wall coverage of the satellite imagery.

L. Kish photo

Another long term goal of this project is to come up with a map of the US with nectar flow dates and variability. Right now the resolution of this information is very course but as more data is collected and analyzed the clearer the picture will become.

How do I become a volunteer?

First you go to the **http://honeybeenet.gsfc.nasa.gov/** web site and nose around. Get your GPS (latitude and longitude) coordinates. Then you will answer a short questionnaire. Citizen-scientist-beekeepers will need to purchase an industrial sized scale to weigh their colony each day. Data is then entered and sent directly to Dr. Esaias through the HoneyBeeNet site. The best possible scenario is if the colony could be weighed each and every day. But we all have lives and sometimes are not around to take such measurements. So every few days will work also. Since these scales cost around $300 new, (sometimes used for $20-60) I think it would be an appropriate use of local or state beekeeper's association funds. If a local/state club set up a scale hive members could rotate responsibilities weighing the colony so no one is carrying the entire burden.

As proven climate change is occurring. Now whether or not we are contributing to that change doesn't really matter, does it? What does matter is we could be and should be better stewards of this planet and to our bees.

Whether the weather be cold,
Or whether the weather be hot.
We'll weather the weather,
Whatever the weather,
We'll weather it, like it or not!
See Ya! BC

Jennifer Berry is the Research Coordinator at the University of GA Bee Lab. Contact her at ***Jennifer@BeeCulture.com***.

NATURAL REMEDIES

Algarrobo, Agrimony, Glossy Abelia

Abbas Edun

ALGARROBO

The American Carob (*Prosopis pallida*), European Carob (*Ceratonia siliqua*), Jatoba (*Hymenaea courbaril*), Judas Tree (*Cercis siliquastrum*) and Rain Tree (*Albizia saman*) are all known as Algarrobo. The aim of this article is to provide the reader with some interesting facts about the American Carob.

Prosopis pallida is a thorny dicotyledonous shrub or small tree of the legume family Fabaceae. It has the following common names: Bayahonda, Cloncurry Prickle Bush, Huarango, Kiawe, Mesquite and Tree of Life. It is also known to botanists as *Acacia pallida* and *P. limensis*.

Algarrobo is indigenous to the very dry coastlines of Bolivia, Colombia, Ecuador and Peru. It was introduced to Hawaii in 1828, and is also naturalized in Puerto Rico, northern Mexico and the southwestern United States, as well as New South Wales and Queensland in Australia.

The tree does not tolerate frost. The soils where it grows, and to which it is well suited, are mostly neutral to moderately alkaline, and frequently stony. They form on the arid or semi-arid, level to moderately steep coastal lands of the leeward Hawaiian Islands[1] and are developed from alluvium, basaltic rock or ash, coral limestone and olivine.[2] In the driest locations, the tree is confined to the bottoms of gullies; in other places, it extends onto ridges, and is a dominant component of the vegetation in those areas.

Algarrobo is a phreatophyte[3] with a very long taproot which is able to penetrate as deep as 160-260 feet (50-80 m.) to subterranean water channels. As well as drawing up water for the tree, the roots bring it into the higher subsoil and create a water source for other plant life.

The size and growth form of the American Carob vary considerably because of genetic and environmental considerations. It usually grows about 15-20 feet (4.5-6m.) tall; however, in one area on the Big Island of Hawaii, underground water is so close to the surface that they can grow to a height of 65 feet (20 m.).

The short, crooked or twisted trunk may reach a diameter of up to 2 feet (60 cm.). The bark is grey or brown, rough and fibrous, varying from finely fissured to furrowed according to the age of the tree. Under natural conditions, the crown is generally open and wide-spreading.

Mimosoid flowers produce large quantities of nectar and pollen over an extended period[4] as a nutritive reward for potential insect pollinators, including bees. The tree is a prime source of monofloral honey which is light yellow in color and generally of good quality, having a pleasant taste and only a slight aroma. The honey is so delicate that it must be handled very carefully so as to preserve the natural excellence of its flavor, texture, and nutritional qualities.

The fruit is a natural energetic food rich in fiber, sucrose and proteins. It also contains vitamins A, B complex and D, and is a good source of calcium, iron, magnesium, phosphorous, potassium and tannins. The leaves are known for their advantageous medicinal properties. They contain quantities of free amino acids and flavonoids, with alkaloids and diketones[5] isolated as active ingredients.

Because of their bactericidal and fungicidal activity, Algarrobo extracts are widely used in the preparation of medicinal products to treat many human ailments. The main ones treated with an extract of the leaf and bark are infections of the mouth and throat including ulcers and bronchitis, internal diseases such as parasitic infections and urinary problems; externally it is used for dermatitis.

In optical and dermatological ailments, the extracts form a protective antiseptic coating over lesions allowing the tissues below to regenerate. There is a similar coating over inflamed mucous membranes when the extracts are used for diarrhea and stomach disorders; the action of irritants is thus prevented and the absorption of toxins is decreased.

In some countries, the flowers are mixed with sugar and administered for the prevention of miscarriages, an extract of the bark is employed in the treatment of asthma, bronchitis, dysentery, leprosy, leucoderma,[6] rheumatism and tremors and as an antiseptic on wounds. The gum exuding from the trunk is used to treat eye infections and preparations from fresh buds are used to treat conjunctivitis.

Algarrobo

AGRIMONY

Aaron's Rod, Burr Marigold, Church Steeples, Cocklebur, Fairy's Wand, Harvest Lice, Liverwort, Philanthropos, Rat's Tail, Sticklewort and White Tansy are the common names of *Agrimonia eupatoria*. It is a member of the rose family Rosaceae, and is also known to botanists as *A. procera*.

This herb is found abundantly throughout England and Scotland. It is widespread in Africa, Asia, northern and central Europe as well as in North America, and is found growing wild on the sides of agricultural fields and near roads. It also flourishes in all types of wetlands, marshes, meadows, pastures, thickets, sandy terrains and general open areas, and once established requires little management.

Most types of soil support the growth of Agrimony; although it is naturally adapted to alkaline soils, it can tolerate a slightly acidic one. The herb requires water during the dry periods or it will fail to bloom. It does best in full sun but it can also endure partial shade.

Agrimonia eupatoria can live for many years, growing one to two feet (30–60 cm.) or more in height from a long, somewhat woody perennial root. The erect, cylindrical stem is covered with soft, silky hairs. The leaves are hairy, alternate, and pinnately divided, with coarsely toothed leaflets. Its small familiar yellow flowers grow at the top of the stem in long spikes, the blooms opening one above the other. They are hermaphrodite[7] and blossom from June to August, releasing a distinctive, spicy and pleasant scent which is usually compared to apricots and is attractive to honey bees and other insects.

Agrimony

The nodding seed urns are encircled by a rim of hooks which enables epizoochorous adhesive dispersal; the hooks cling to our clothing or to animal fur and are usually removed to another location.

The leaves, flowers and root have a very long history in herbal medicine; the plant is very famous as a vulnerary[8] with anti-inflammatory and diuretic properties. The tannin content is responsible for alleviating pain; it binds water upon contact with tissue and thus inhibits bacterial and viral infections.

The other active ingredients of the plant are agrimophol, bitter glycosides, coumarins, flavonoids, mucilage, volatile oil, polysaccharides and triterpenes. Agrimophol is used as an anthelmintic while the glycosides are demulcent,[9] enhance mucosal blood flow and stimulate the secretion of mucus. In-vitro and animal studies suggest that the plant may be useful for hypertension and for inhibiting the growth of tumors.

Agrimony tea helps to remedy diarrhea and gastro-intestinal diseases. It stimulates the production of bile and gastric juice, and is used in the treatment of chronic cholecystitis[10] accompanied by stomach acidity. Gargling with the tea helps to resist a sore throat and pharyngitis; it is made by placing two rounded teaspoons of the dried leaves into a cup of boiling water and allowing them to remain for 10 to 15 minutes. The tea is then cooled and strained, and taken three times a day.

A tincture made by extracting the medicinal constituents of leaves and flowers in a mixture of water and alcohol is popular among orators and professional singers.

For external use a decoction is made by simmering two to four ounces (60-120 g.) of the leaves and stem in 1½ pints (750ml.) of water for 10 to 15 minutes; it is reputed to be soothing to the sole, ankle and toes when used as a foot bath.

Care must be taken when using *A. eupatoria* as an herbal. The plant is known to cause individuals who are easily affected to experience the symptoms of photo-dermatitis. It is a type of skin rash that may develop following the use of the herb; it appears when the person's skin is subsequently exposed to direct sunlight. Some studies show that remedies made from Agrimony may result in lowering the blood pressure of the user. For this reason, the herb must not be used by those who are undergoing anti-coagulant therapy or who are taking drugs for high or low blood pressure.

Pregnant women and nursing mothers should avoid using this herb medicinally as it may affect the menstrual cycle. Moderate consumption of the tea is also advised because of its tannins, the harmful effect of which may be mitigated by the addition of milk.

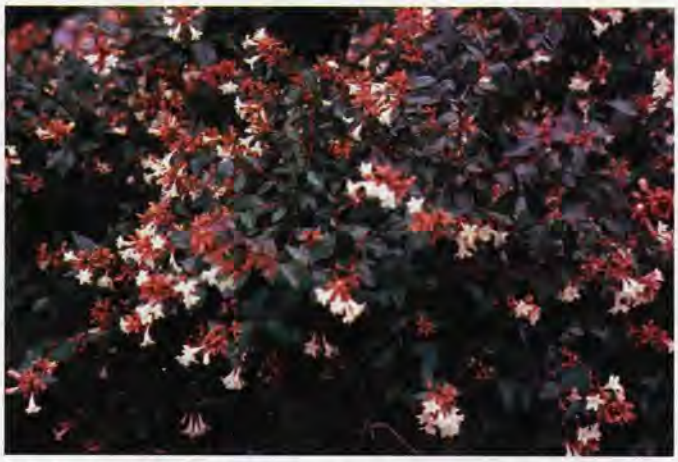
GLOSSY ABELIA

Abelia is a genus of about 15 to 30 annuals and biennials in the honeysuckle family Caprifoliaceae. They are indigenous to China, Japan, the Ryukyu Islands,[11] Taiwan and Mexico, and are also found in Florida, North Carolina, in upland India, and on the Black Sea coast of the Caucasus, where the Winters are mild and warm and the Summers hot and dry. The plants vary widely in growth habit, cold hardiness, and flower color and size; those that are in warm climates are evergreen, while the ones in colder places are deciduous.

Abelias are robust, insect resistant plants which are not affected very much by changes in temperature or atmospheric pollution. They grow best in a moist, slightly alkaline, organically rich soil which is well drained. The plants grow well in full sun or partial shade, but irrigation is often required in the Summer.

Abelia × *grandiflora* is a species created by the ingenuity of man; it is one of only two interspecific hybrids ever developed within the genus,[12] and was formerly known to botanists as *Abelia rupestris*, *Linnaea pringiana* and *L. spaethiana*.

This fast-growing deciduous or semi-evergreen shrub with a life span of five to 20 years usually grows from five to seven feet (1.5-2 m.) tall in an upright bush-like fashion. Its arching branches have a spread that equals



Glossy Abelia

the height of the plant. The fine-textured leaves are glossy, ovate and dark green. It is an attractive shrub that produces cymose clusters of small, white-pinkish, tubular flowers from Summer to Fall; they generally appear in the upper leaf axils and stem ends, one to eight in a cluster.

The flowers are very fragrant, long-lasting and attractive to honey bees. The plant is a valuable source of nectar and pollen in the temperate Himalayas from Kashmir to Afghanistan, China and Japan up to an elevation of about 6,000 feet (1,850 m.).

Glossy Abelia, like very many of the plant species with tubular flowers, is likely to experience some form of nectar robbing.[13] It appears as if the flowers are morphologically matched to pollinators which have longer tongues than honey bees because the latter steal nectar through slits made by other insects in the tubular corolla near the base.[14] But such bees also rob species that they could pollinate legitimately, perhaps because taking nectar through the slits may require less effort or provide greater rewards than legitimate visits.[15] Honey bees sometimes collect pollen from the mouth of the flowers.

Two secoiridoid glucosides, abeliosides A and B, were isolated together with cantleyoside and sylvestroside II from the leaves of the plant.[16] Abelioside B is a secondary metabolite[17] utilized in the treatment of cardiac arrhythmia and congestive heart failure. It diminishes the heart rate, increases the tonicity of the cardiac muscles and reduces ventricular volume. Oil extracted from the bark is effective in providing protection for the skin, keeping it moist and inhibiting bacteria, while preventing irritation and soreness. BC

Abbas Edun has been keeping bees in Ontario, Canada since 1979.

References

[1]One grove of the trees grows sparsely at sea level in near-desert conditions on the leeward side of Big Island.

[2]*Any member of a group of common magnesium, iron silicate minerals. Olivines occur in many igneous rocks and are a major constituent of the earth's upper crust. The chemical formula is* $(Mg,Fe)_2SiO_4$.

[3]A deep-rooted plant that obtains a significant portion of the water that it needs from the zone of saturation or the capillary fringe above that zone.

[4]The flowers of are among the most prolific producers of nectar in the world. In Hawaii, the trees begin to flower when they are between three and four years old. They are able to blossom at any time of the year and frequently twice a year. They are usually in flower between January and March, but in some years when the Summers are rainy, they bloom in September and October.

[5]Compounds containing two carbonyl groups, e.g., acetylacetone.

[6]Also known as vitiligo, it is a rare disease in which certain parts of the skin gradually lose color leaving behind white spots and patches. It occurs because of a loss of melanin, a dark pigment which gives color to our skin.

[7]That is, they have both male and female organs. Each flower only lasts three days before it dies.

[8]A remedy used to promote the healing of wounds.

[9]Anthelmintic: destructive to worms. Demulcent: an agent that forms a soothing film over a mucous membrane, relieving minor pain and inflammation.

[10]An inflammation of the gall bladder wall and nearby abdominal lining. It is usually caused by a gallstone in the cystic duct which connects that bladder to the hepatic duct.

[11]Also known as the Nansei Islands, they are located in the western Pacific.

[12]It was developed through the hybridization of *A. chinensis* and *A. uniflora* and was first cultivated in 1886 at the Rovelli nursery, one of the best known Italian growers of plants at that time. The nursery was located at Pallanza, Verbania, on the western bank of Lake Maggiore in the Piedmont region.

[13]Irwin, R. E., and J. E. Maloof. 2002. Variation in nectar robbing over time, space, and species. *Oecologia* 133: 525-533. Springer Publishing Co. (doi:10.1007/s00442-002-1060-z).

[14]See *Gleanings in Bee Culture*. 1958. page 294. Published by A. I. Root Co.

[15]Dedej, S., and K. Delaplane. 2005. Net energetic advantage drives honey bees (*Apis mellifera* L.) to nectar larceny in *Vaccinium ashei* Reade. *Behav. Ecol. Sociobiol.* 57: 398-403. (doi:10.1007/s00265-004-0852-z).

[16]Murai F., M. Tagawa, S. Matsuda, T. Kikuchi, S. Uesato, and H. Inouye. 1985. Abeliosides A and B, secoiridoid glucosides from *Abelia grandiflora*. *Phytochemistry* 24:2329-2335.

[17]An organic compound that is not directly involved in the normal growth, development, or reproduction of organisms, but which may be used therapeutically. The beneficial action of the compound is felt when the heart is tired and not working normally; this is caused by inadequate circulation of the blood, and results in problems affecting other parts of the body.

Glossy Abelia

Colony Age Effects

New colonies are different than established colonies. You need to know what the differences are.

Walt Wright

As a precursor to backing out of writing about bees, some clean-up work seems appropriate. In the last submittal, a summary of my views on the double deep were offered. In this submittal, a description of observations relevant to the first few years of colony life will be tackled.

Old literature reads like the colony is just waiting for forage to show up on the horizon, and when that happens in suitable flying weather, they jump on it. Not true. Not only does the colony select the forage sources that best suits their needs, but their needs change with the season advancement and colony age. This submittal is intended to provide an introduction to the effects on operations of colony age. This bee geek is certain that there are many differences that have not come to his attention. There is no harm in identifying those that have, and encouraging you to add to the list at your leisure.

First year colonies operate in an entirely different mode from established colonies. Their objective is to become established. To become established in new quarters, the primary goal is to fill their cavity with functional comb full of stores for wintering. To meet the requirements of that goal, there are multiple top priority activities: brood nest expansion to increase population; comb building to support both brood rearing and stores accumulation; and a forager workforce to feed the colony, provide the raw materials for growth, and accumulate Winter stores. To get it done, they must build population as rapidly as possible. In my area, most don't get it done without help from the beekeeper. Having a larger bee population starter colony and a smaller cavity tends to improve the odds of survival. Some seasons and areas provide better conditions to support establishment than others. A *product* of reproduction, by whatever means, their motivation to reproduce by swarming is minimal. All this to say that establishment is challenging enough without distractions.

Colonies in the establishment mode will be called "starters" in this discussion. Starters come in a variety of types, including the natural swarm and several types of man-made first year colonies. To insure we are speaking the same language, a brief description of man-made starters is provided. Some beekeepers use the words splits and nucleus colonies interchangeably. For purposes here splitting is the action verb of removing a frame or frames from a donor colony. The product created with those frames is the noun form of nucleus (nuc) colony. In keeping with that distinction, we will not call starters "splits", but will refer to them as "nucs". Typically, the split frames are used to populate a nuc. Further, the nuc is typically confined to smaller quarters that the starter can protect and adequately maintain brood-rearing temperatures. Less space is not a firm requirement. A nuc can be housed in a full-sized box, and be encouraged to grow into the larger space.

A laying queen for the starter nuc can be insured by several alternatives. Each option has its own advantages. They can be provided with a caged, laying queen, queen cells nearing queen emergence, or encouraged to rear one from brood. Delays in newly emerged queen maturing, mating, and the start of laying can extend the time to nearly a month for the raise-their-own queen to start egg production. Referred to by some as a "walk away split" that nuc gets off to a very slow start. They not only have some delays in egg production, but when brood rearing gets underway, the starter colony still has to organize the work force for the task at hand. This may seem off-topic to the subject of this submittal, but the history of the starter colony is quite relevant to activities of first year colonies. Read on.

The natural swarm is the best prepared of all types of starter colonies for meeting the rigors of establishment. The swarm left the parent colony with the best mix of age-related workers to get it done with efficiency. The literature tells us that the workers change physiology with age to adjust their adaptability to perform in-hive tasks. The youngest bee's glands are better suited to production of brood food, wax makers have an age bracket, etc.

Swarm preps in the parent colony produce a cross section of age-related workers that are geared at issue to have the best chance at establishment in a new location. Those of you who like puzzles can give me your

The natural swarm is best prepared of all types of starter colonies for meeting the rigors of establishment.

best guess of how they get that done in one brood cycle. My description of the outward indications of the swarm process was provided in Swarm Preparation, *Bee Culture*, May 2003. Note that foragers were accumulated prior to the swarm prep period. You will have to wing it on the ratios of comb construction (wax makers) and brood rearing nurse bees in the mix. If that exists in the literature, I haven't seen it.

Although it is difficult to grade the above starters as to how well they are prepared to accomplish establishment, it is important that we understand that all shift into that special mode of operations. All first year colonies are oriented to establishment and its associated requirements. Without relative grading of potential some additional notes are added.

Nucs are reported to get off to a better start than packages. That can be attributed to being started with some drawn comb, brood in production, some honey and pollen stores, and a complement of adult bees to care for the brood and to forage. That does not mean that the nuc is properly geared for that point in the season. Various delays in having a functional queen were mentioned above. What we often neglect to consider is the proportions of age-related workers in the existing population of adult bees. To provide just one example: If the split frames were removed very early in the season, before the donor colony had wax-makers, the adult bees were mostly foragers and some nurse bees. There will be some time before wax-making is available for expansion onto foundation. Worker emergence from capped brood automatically provides young bees for nursing duties, but the duties of older house bees are delayed. In the mean time, the surplus of foragers is filling in some brood cells with stores that reduce brood rearing capacity. The nuc is losing ground on expansion.

In contrast, the natural swarm, with the right age mix of workers to support establishment, is expanding the brood volume from week one. They will typically outgrow the nuc in the early going.

Then, there is the package. Again, depending on where and when, the package can have a better mix of bees prepared to support establishment. Packages from the Deep South in April have a good compliment of wax makers. Wax makers are being generated at that point in southern bee development for the "main flow" accumulation of honey. Other house bees are also being reared in that period.

In summary, know the questions to ask of your starter bee source. If a nuc, find out how long since it was assembled. After about two brood cycles (1½ months) the nuc will be getting organized for establishment, and should be ready to move out on expansion. House bees above nurse bee age are not a priority in the early season for the established colony providing the starter nucs.

Avoid early packages from your immediate area, or schedule delivery later. This advice presupposes that you are familiar with the seasonal bee development schedule at the location of the source. The beginning beekeeper is severely handicapped in this respect.

The overwintered, established colony emerges from Winter with the objective of generating a reproductive swarm. The procedural steps to implementing the swarm are predictable and are synchronized to forage availability for their specific location. They need to get the swarm issued in a period of forage available to support swarm establishment in a new location.

The colony that issues the reproductive swarm protects its own survival by resupply of stores prior to committing to swarm. The expanded brood nest to rear swarm bees is partially backfilled with stores, reducing population for later honey accumulation and capping. Parent colonies that generated a swarm are known to produce less surplus honey. Having nearly met survival needs prior to swarm commit, they have fewer bees for the main flow and less motivation. We refer to the motivation reduction as "complacency". They can coast to this year's survival in a walk. Any surplus honey generated is the result of the safety margin built into all survival requirements.

Another factor in the equation is the colony skill in the balancing population in proportion to stores/cavity size to protect accumulated stores. They do this by adjustment of brood volume. The swarmed parent colony started brood nest reduction in the swarm prep period - nearly two brood cycles prior to "main flow."

The established colony that does not complete swarm preps prior to the seasonal time limit and does not commit to swarm may increase brood volume for another brood cycle. That colony may be increasing brood volume while the swarmer is decreasing brood volume so it will have more bees to exploit the "main flow". The non-swarmer

When setting up a nuc, we often neglect to consider the age proportion of the workers we are adding..

will still start brood nest reduction a brood cycle before "main flow," but reduction of brood nest size is slower in periods other than swarm preps. In the swarm prep period the colony is fighting a seasonal deadline, and gets it done as quickly as brood emerges from those cells. Anybody make sense of the above? Try reading it again.

The advantages of swarm prevention are well known, as it applies to honey production. Although the reduction is generally attributed to loss of bees to the swarm, I don't see that as the major difference. The early brood reduction of the swarming colony appears to me to be more significant. As is the "complacency" factor.

The second year colony emerges from Winter with the ability to continue in the establishment mode from the first year or act like fully established with swarm ambition. Actually, they can do both. The colony that senses that establishment was not fully accomplished in the first year emerges from Winter with wax-making capability. If they did not completely fill their cavity with functional comb in the first year, that's their second-year first priority. They may have provided enough stores for wintering, but fringe areas were not completely filled with combs of stores. After completely filling the cavity with functional comb with the aid of early wax making, they can pursue reproduction. With enough calendar time to the seasonal time limit, they can generate a reproductive swarm.

The colony that senses full establishment was accomplished in the first season does not develop wax-making capability until other established colonies (third and subs) at the beginning of the "main flow." They both come out of Winter with reproductive ambition, but the colony that was not quite fully established in the first year has the added advantage of early wax-making ability.

Regardless of whether or not they swarm, the second year colony has a couple of operational differences that are unique. Some beekeepers are aware that second year colonies make more honey than established colonies. (Last year's swarm starter is this year's best producer.) The reason second year colonies produce more surplus is that they will add nectar overhead during the lull in overhead storing of established colonies – that period between the "early flow" and the "main flow." The nectar is stored raw or undried but it gets the second year colony ahead of the established colony a couple supers or more locally because the established colony is storing very little overhead through that three week period. The beekeeper, wishing to take advantage of this trait should pay attention to supering with drawn comb on the second-year colony during the lull of the established.

A second difference in colony second year operations concerns supersedure timing. My management approach (Nectar management/checkerboarding) encourages larger brood volumes in the Spring and annual supersedure. Three-year established colonies generally supersede early in the "main flow." That's an ideal time for them to be temporarily queenless. The workforce to exploit the flow is in place, and in that period the colony is automatically reducing brood volume to protect consumption of accumulated stores. The old literature references to "consumer bees" don't seem to recognize that the bees have this protection in their survival genetics.

The second year colony generally supersedes a brood cycle earlier, at "reproductive cut-off." Or, supersedure cells appear about that time. Assuming the existing queen does not get unruly, she may not be terminated until the cells have been in development for some portion of the three week brood cycle. In that case, the timing difference would not be significant. The beekeeper who checks for swarm cells in the early season needs to be aware of supersedure cells in the swarm issue period. Otherwise, he might disrupt a potentially super producer. Supersedure cells were described as seen in my management system in an article in this magazine July, '05.

I have no reasons for the differences observed. I report what I see. It is not obvious to me how these differences support the overall species survival strategy. The above second year differences may have some useful function if the second year is really an extension of first year establishment.

This has been an unduly long submittal just to identify some variations in second year colonies. I'll leave in the descriptions of types of this year starters in the hope that editor Flottum will indulge me one more time. Those descriptions of different starter types will be of little use for you seasoned beekeepers, but may be of interest to those beginners selecting a source of bees to get started. The referenced older articles are archived at **www.beesource.com**. Point Of View. Descriptions of early season colony development schedules as seen in Tennessee are also there. BC

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Small Hive Beetle IPM

Mike Hood

There are many options available to beekeepers to practice integrated pest management (IPM) of small hive beetles which have become a troublesome pest, especially in the southern U.S. when conditions are favorable for their reproduction. Although we do not know all the answers to what conditions favor small hive beetle reproduction, we have developed an arsenal of control recommendations and tools for controlling this hive pest. This article is part one of a two article series where we are going to discuss the integrated management of small hive beetles in the context of the eight basic IPM beekeeping principles.

Acceptable Pest Levels. In my last article in the November issue of *Bee Culture*, I stated that an effective IPM program is based on a treatment threshold system. Although attempts have been made to develop a treatment threshold for small hive beetles (SHB) in managed colonies, there has yet to be one published. Research is also needed to develop an effective beetle sampling tool which will estimate the total number of beetles in a colony without having to conduct a whole colony beetle count. We are somewhat handicapped in our IPM approach to control this hive pest without a treatment threshold system. However, there are a few general guidelines that we need to follow in our IPM of of this hive pest.

The beekeeper must resist the temptation of treating the colony with a pesticide when only a few beetles are present in the hive or treating when it is obvious the colony collapse level has been reached. We now have several practical tools in our small hive beetle control toolbox which offer the beekeeper some help in maintaining low beetle populations.

Preventive Cultural Practices. Maintain Strong Colonies. Beekeepers should practice good colony management to help the bees defend their colony from the negative effects of pests such as the small hive beetle. Good colony management starts with a good laying queen that can regulate the colony population to maximize the chances of survival. Her genetic makeup is paramount in that her progeny must be able to sustain the colony in the presence of various diseases and pests, including small hive beetles. In general, a high bee-to-comb ratio is recommended for SHB control.

Another cultural technique recommended for beetle control is the placement of colonies in full sun to create drier soil conditions to help prevent successful beetle pupation in the ground. Beetles need moist soil to pupate and the placement of colonies in a shady, damp location is not recommended. This recommendation runs counter to what most beekeepers were taught in the past: to place colonies in locations that offer early morning sun and afternoon shade, particularly in the hot Summer months. Beekeepers should also be careful in placement of their colonies in or near irrigated crops which are often grown in damp soil conditions.

Minimum Manipulation. Honey bees have their own method of defending the colony from small hive beetles. Worker bees chase and corral the adult beetles into confined areas inside the beehive which prevents the beetles from freely roaming the hive and laying eggs on or near stored pollen and bee brood. The beetles need the pollen and brood as a source of protein for sustained nourishment and growth. Without the necessary protein in their diet, beetle reproduction is hampered.

When beekeepers open their colonies, beetles often escape confinement and freely roam the colony again. If the colony is showing signs of stress, the bees may not be able to re-corral the beetles, which may lead to an increase in beetle reproduction. Therefore, beekeepers should not open their colonies unless necessary, such times as honey removal from the colony or feeding to prevent starvation. This is particularly true during times of the year when beetle popula-

Shady/damp beeyards favor Small Hive Beetle reproduction.

Worker bee corraling beetles.

Collapsed colony showing symptoms of "Leaking" caused by high Small Hive Beetle infestation.

Freeman Beetle Trap with vegetable oil tray removed from rear of beehive.

tions tend to increase which begins as early as May in the southern U.S. and may continue till early Fall. New beekeepers should resist the temptation to over manipulate their colonies. The queen simply does not have to be checked on a daily basis. Leaving colonies open during inspections can also lead to stress from robber bees from nearby colonies, especially during times of dearth.

In beekeeping operations that have a history of beetle problems, it is recommended not to use hive inner covers or frame spacers as they provide additional hiding places for the beetles to hide and to avoid bee contact and imprisonment.

Monitoring practices. If small hive beetles are present in a colony, their presence is normally obvious when the beekeeper removes the hive top and carefully inspects underneath the top and exposed frame top bars. Beetles do not care for light conditions and will seek refuge quickly. So, the beekeeper can often get a good idea of the number of beetles present in the colony simply by checking for beetles in the top of a hive. If there are many beetles in the top of a hive, a further inspection of the brood chamber is highly recommended to get a better idea of the total beetle population.

Another quick beetle survey tool is to lift the top super off the colony and bounce it gently a couple of times on an overturned telescoping hive top which the beekeeper has placed on the ground. If beetles are present in the super, some will dislodge and fall to the hive top inner surface below.

A tell-tale sign of a major beetle problem in a hive is when the entrance landing board is soiled with residues of fermented honey which has oozed from frames inside the hive. This is normally a sign that the bee colony has reached the colony collapse level or the colony has succumbed to major beetles activities. "Leaking" is the term that is commonly used to identify this beetle damage stage. Immediate hive removal and treatment of the soil left behind is recommended.

Genetic control. Scientists have discovered that African worker bees readily remove unprotected SHB eggs and larvae. This behavioral trait likely plays an important role in the apparent resistance of African bees to beetle infestation. Cape honey bees which only live in the southern tip of Africa have shown the ability to identify capped bee brood cells that the female adult beetles have made a slit in and then oviposited their eggs beneath the cap. The bees tear into the cells and remove the cell contents including beetle eggs and larvae. These traits likely occur in our European bees at a much reduced level, however these hygienic behavioral traits may possibly be incorporated

Hood Beetle Trap mounted with top flush with frame top bar on shallow super frame.

Beetleeater.

in a selection program.

Bees often use prisons constructed of propolis to confine adult beetles. African bees are known to collect and utilize more propolis than other bees races, therefore this activity is another possible reason that African bees show resistance to beetles. Selection of bees that utilize more propolis may contribute to beetle resistance.

Mechanical control. Several mechanical trapping devices have been developed in the U.S. and Australia to control small hive beetles. Most of these beetle traps use either vegetable or mineral oil as the beetle killing agent. Caution should be used in the use of these oils because they can also be deadly to your honey bees. After use, these oils should be recycled or disposed of properly to prevent environmental contamination.

Beetle traps should play a major role in most integrated management plans because of their safety in providing control without fear of hive product contamination. Traps provide a low cost form of sustained beetle control as long as there is little chance of mass beetle immigration into the apiary. The major disadvantage of most beetle traps is regular trap service is necessary.

A beetle trap has been developed for use outside hives, but it has been used only to monitor beetle movement in an area. The trap was made of a 25.5 cm section of black PVC pipe with 7.5 cm interior diameter with both ends of the pipe covered with 18-mesh screen cones. A bait made of pollen dough conditioned by allowing male SHB to feed on it for three days was placed inside the pipe which was suspended about one meter above ground. The traps were found to be attractive to beetles preferably when the traps were placed in shade. These traps are not marketed and do not likely compete well with bee colonies for attractancy. However, there are many in-hive traps presently marketed, but most have not been compared in trapping efficiency with other traps.

Full sun, strong hives, minimal manipulation and fast action will all help.

The West beetle trap was the first beetle trap marketed in the U.S. The West trap is a hive bottom trap that includes a removable tray that should be partially filled with vegetable oil that beetles enter and die. The trap is designed to be serviced through the hive entrance. A similar hive bottom trap known as the Freeman trap has been developed recently which also utilizes a removable tray with vegetable oil, but this trap is serviced conveniently from the back of the hive. One big advantage of these bottom hive traps is that they incorporate the use of oils which also kills *Varroa* mites that fall into the oil tray.

The Hood beetle trap was developed at Clemson University and is a plastic box trap with three separate compartments that can be partially filled with various lethal agents and attractants. The best readily available attractant that I have found is apple cider vinegar which should be placed in the middle compartment and food grade mineral oil in the two side compartments. The trap should be secured inside an empty hive frame and placed in frame position number one or 10. Beetles enter the one-way beetle trap and become immobilized in the mineral oil and die. Our research with the Hood trap indicates that roughly the same number of beetles can be trapped in the top super as can be trapped in the brood chamber. However, placement of the trap in the hive body has an added advantage of doubling as a drone brood/*Varroa* mite trap. Bees will construct only drone brood cells in the void area of the frame and the queen will lay drone eggs. When the drone brood is about two-thirds capped, the beekeeper simply cuts out the comb and places it in a freezer to kill the *Varroa* which were highly attracted to the drone brood.

AJs Beetle Eater trap was developed by an Australian beekeeper and is marketed in the U.S. The trap is a two piece longitudinal plastic trap that should be partially filled with vegetable oil and suspended between two frame top bars. Laurence Cutts, former Florida State Apiarist, has recently developed a similar beetle trap, the Beetle Blaster. This trap is also placed between two frame top bars, however his trap has a removable plastic disposable bag that holds the dead beetles. The Beetle Blaster and AJs Beetle Eater traps can be placed between frame top bars in the bottom brood chamber or supers above or both.

Other forms of mechanical hive measures have been investigated that have not proven to provide beetle control. Bottom screens tend to increase hive ventilation and light conditions near the bottom of a hive, but have not proven to increase or decrease the beetle population. Reduced hive entrances in the form of round plastic pipe entrances did not control beetles. No studies have shown diatomaceous earth to provide beetle control. BC

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*(**NOTE.** Next month we will continue our discussion of the integrated pest management of small hive beetles. We will cover the last three beekeeping IPM principles: physical control, biological control and chemical control.)*

BeetleBuster.

Smokers and Hive Tools and Veils, Oh My – If It's New This Year Give It A Try!

Ann Harman

Wow! Just look at all these wonderful tools and gadgets in the equipment catalogs! Beekeeping is going to be lots of fun. Now look here – you are a brand new beekeeper, taking beekeeping classes. You don't even have your first colony yet. You don't have any idea what all those really neat tools and gadgets are for, or whether they are useful to you.

On the other side of the coin, you are the beekeeping class instructor. What are you going to recommend to those eager students? There is no point having them waste their money on something that they are not ready for until they are well-established as beekeepers. Or perhaps something they will never need.

So let's have a look at what the well-equipped beekeeper needs to start beekeeping and what gadgets are best to put on the waiting list. We'll also have a look for something to put all these useful items in.

The four essentials are: veil, smoker, hive tool and some way of keeping records. I, and others, have written about ways to keep records so we will not dwell on that at this time. The other three will be discussed separately.

I do feel sorry for the new beekeeper trying to decide on a veil. So many different styles are available now: separate veils, ones with jackets and ones attached to coveralls. The choice is difficult without actually seeing some. Here is where the local association giving a beekeeping course for newbees can give some guidance. Give a "fashion show." See how many different styles of veils can be borrowed from association members and let the students try them on. It certainly is easier to make a decision from seeing and trying the real thing than from a picture in a catalog.

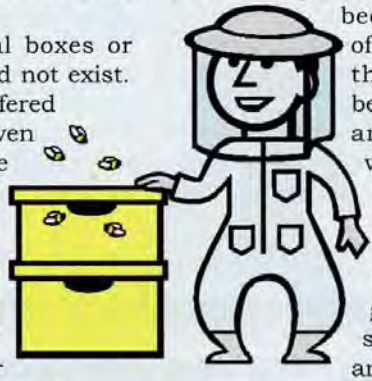
By the way, both instructors and mentors should always, without fail, wear a veil when teaching, mentoring or demonstrating at field days. Not wearing a veil in the privacy of your own apiary has nothing to do with the need for setting a good example for the students.

Fortunately the styles in smokers is much more limited than veils. About the only real choice is size. Although a small smoker might seem to be the right choice for someone with only one or two hives, I think the small ones suffer from a runt complex. To me they seem to be hard to light and hard to stay lit. The one thing a beekeeper wants a smoker to do is to stay smoking from beginning of hive work to the end of it, no matter the length of time. A heat shield is nice – saves some burned fingers.

Smoker fuels are being sold in the equipment catalogs. The usefulness of these depends on what is available from nature, such as dry pine needles. Nevertheless, even with lots of natural fuel available, a small amount of the commercial smoker fuels are handy to have for emergencies.

Smoker safety needs to be considered right from the beginning. Even with a heat shield smokers are hot, especially on the bottom. New beekeepers really do need some information and suggestions for fire prevention. They may not realize that setting a smoker down on dry Autumn leaves or dry grass can start a fire.

Until recently metal boxes or metal smoker holders did not exist. Still only a very few are offered in equipment catalogs. Even these may not be suitable for every beekeeper. A walkabout in a farm supply store or some visits to yard sales may produce just the sort of metal pan or container that suits. Take your smoker with you! For transporting in a pickup or van my smoker lies on its side in a shallow metal pan that has two inches of sand in it. A metal container that can be carried may be more useful.



Smokers have to be lit. Why does a wind have to blow just when lighting a smoker? One of Murphy's Laws of Beekeeping. If you think you can keep a match lit long enough to start a smoker, a box of matches is fine, until it gets forgotten in the beeyard and the matches get wet from a rain shower. Cigarette lighters and BBQ lighters work very well and are inexpensive. Add one or both to the equipment kit. The simple BBQ lighters are large enough not to get easily lost.

Now for a hive tool. One I shall call "traditional." But hive tools have had a "fashion" explosion just like veils. You can find all sorts of shapes and sizes. Beginners – start out with the traditional one. Instructors and mentors – show the newbees how to use it. Seriously, some people seem to use a hive tool naturally and efficiently. Others really do have to be shown or the ensuing damage to frames and comb is indeed interesting and remarkable. If you, as a mentor, are using one of the new designs your newbee can certainly try using it to see if it is suitable. In this situation a mentor can supervise its use and instruct as needed.

One item that always seems to be important for the beginning beekeeper is a pair of gloves. Many feel that some barrier between bare hands and crawly things with stingers relieves the anxiety about being stung. Unfortunately the thick leather gloves, that seem so secure, prevent any feel of a bee under a finger and make removing a frame clumsy. A double pair of exam gloves or the wonderful yellow rubber dishwashing gloves al-

low both protection and the feel of a bee under the finger. I use the yellow gloves when working with the ferocious African bee. They are great!

So now the beginning beekeeper has the essentials. Certainly a few items can be added that will be useful. A bee brush is usually recommended in beekeeping courses. Actually it should be called a "bee flicker" because if it is used as a bench brush the bees will be annoyed. Mentors – here is another teaching moment. You need to demonstrate the correct use of a bee brush. Since I live in a rural area I have access to the best bee brushes – a goose or turkey wing feather. Bees ignore feathers. Instructors – see if you can collect some nice wing feathers and present one to each student as a "graduation present."

In these times of *Varroa* infestations, a capping scratcher is a nice addition to the beekeeping kit. Here is still another teaching moment for instructors and mentors. It really is not obvious from a brief description to a beginner just how to pull drone pupae to look for varroa (are those brown spots *Varroa* or bits of wax?). I have seen great chunks of comb removed by a newbee. Remember, some people learn by listening, some by seeing, some by doing and some by a combination of those. Although photos and diagrams can help, there is nothing better than an actual demonstration.

Send the newbee to the hardware store. There an essential part of every beekeeper's kit will be found. A roll of duct tape. There is no point in listing all its uses. Every beekeeper will discover some of those sooner or later.

Now that the essentials have been gathered, they need to be in some sort of container. No matter what the beekeeper is wearing there are not enough pockets to hold the essential tools and gadgets now or in the future. A simple container is a three-gallon white plastic bucket. It is lightweight, easy to carry. A canvas tool carrier can be bought that fits over the rim. The pockets of these do keep small things from getting buried in the bottom of the bucket. You can also find a toolbox or a tote from some of the beekeeping equipment suppliers.

Decision time. Will the tool container be carried just around the beeyard or for a long distance? Weight of the container and contents can be a factor. Man has put wheels on heavy items for a very long time. Beekeepers might want to consider wheels for their tool kit. Some years ago, before suitcases had built-in wheels, I bought a suitcase carrier. Unfortunately it had tiny wheels. Useless. Tiny wheels do not roll over lumps and bumps. It was tossed out and a better one bought with heavy-duty six-inch-diameter wheels. After suitcases started being made with wheels this carrier was abandoned. I discovered it when cleaning out a storage space. My bee bucket now travels in style, fastened to the carrier with a bungee cord.

All of us are forgetful – I think we must have a forgetting gene. You head to the beeyard, Uh oh. The hive tool is back at the house where you took it to clean it. Suggest to the beekeeping students that they have a container in the beeyard to keep some spare items. Of course Murphy's Law of Hive Tools states that at some point all six of your hive tools will end up in one place and that place is not the beeyard or your equipment container.

A storage container for the beeyard is really useful. In it you can store a spare hive tool, a few queen cages, and anything else that you might need. The storage container must be weatherproof and the cover cannot fly off in a stiff wind. A three- or five-gallon white plastic bucket can be fitted with a screw-on top. This combination is weatherproof. I have seen a mailbox used as a beeyard storage container. I would recommend the large size simply because you will keep thinking of more things to keep handy so the small one will soon be too small. You may have seen something at the farm supply store or at a yard sale that will serve as beeyard storage. Just make sure it is waterproof.

Since the newbees will be eager to add more gadgets to their equipment containers, a few items can be useful. Another style of hive tool could be added. Velcro leg straps, also called boot bands, will keep bees from crawling up pant legs. For those hot Summer days a sweatband is nice. To encourage new beekeepers to work without gloves perhaps one of the sting-kill wipes or ointments would be a good addition.

Instructors and mentors – if you are good gadgeteers and have made all sorts of small items for specialized purposes, please do not overwhelm the student who is just beginning to cope with live bees, a hive tool that just fell inside the hive, a smoker threatening to go out, and a bee that got inside the veil. The newbee will appreciate simplicity along with good instruction.

Ann Harman is always trying the newest beekeeping gadgets and tools at her home in Flint Hill, Virginia.

SKUNKS

Dan Stiles

I know a lot about skunks. As a kid in the 7th and 8th grade (about 1946-1947), I was a skunk trapper. Everybody in the neighborhood who had skunks living under their porch or raiding their chickens loved me. There was no competition for my job. At the time I thought, little do our neighbors realize that the pelt of every one I trap is worth between 35 and 50 cents! The ones that had really prime, mostly black pelts were especially valuable. The ones with mostly white pelts were not.

My Dad let me shoot his .22 caliber revolver. It was a trapper model – the word "Trapper" was engraved right on the barrel. The revolver held seven shells, but I was allowed to load only one. Someone much older told me that if a bullet were fired with great accuracy directly through the center of the skunk's brain, there was no danger of being sprayed. He also suggested that if I could catch and hold the skunk by his tail off the ground, he could not fire his defensive mechanism. Both bits of wisdom proved to be invalid. Upside down or right side up, they can – in fact, I guarantee – they will spray!

Did you ever wonder how skunks "spray" perceived enemies? I can tell you. They look you in the eye, lift their tail and twist their hind end so you can see their firing mechanism. It is a serious situation at this point and a slow backward retreat is your best option. If the wind is calm, their maximum shotgun style shooting range is about 12 feet. Any family members, regardless of their age, will tell you positively whether or not your retreat was timely enough.

Removing the pelt from a dead skunk was really quite an easy job. The task was complete when the pelt was slipped over a wire frame to stretch and dry. In the process, however, the trapper is inevitably covered with skunk juice – hands especially – although surprisingly the smell is totally absent. It must be that one's smelling mechanism is simply overwhelmed.

My work skinning skunks was conducted in the barn quite some distance from our home. I remember the first time I entered our kitchen after removing a couple of skunk pelts. I could see shock and concern in my mother's eyes. She sent me back to the barn with a supply of

tomato juice (the traditional skunk odor remedy) to wash my hands, along with an entire set of ready-for-school clothes. Both my parents were schoolteachers and left before I did in the morning.

I was sent home from school long before I got to my seat. It seemed I was the focus of a lot of attention – not my cup of tea – I was a very shy kid. The lesson I learned that day is that even if you smell like a skunk, you won't know it.

The other night I was reminded of all this. For the first time in all the years I have wandered around our property here in Morgan County West Virginia, I saw a skunk – the 35 cent kind. I watched him scratching at the entrance of my best hive of honey bees. Skunks can be a serious problem for beekeepers. It's hard to believe, but obviously their scratching irritates the bees in the hive, and the defenders come pouring out – to be devoured by the skunk. And, my good tempered bees were decidedly irritable of late and here was the reason for their sudden mood change.

Can you imagine what would happen if you or I decided to eat a handful of angry honey bees? I have no idea how skunks do it, but they can and do – and are apt to come back every night for more! Not to worry, however, they are easy to trap. I captured my nocturnal bee tormentor in a Havahart trap covered by a big, black plastic bag, and very gently released him in a remote location miles away. Sardines are irresistible bait for skunks, perhaps because they don't bite back when chewed.

By the way, have you ever seen – and did you wonder – who dug up the nest of yellowjackets in your lawn? All that remains is a small round hole in the ground with bits of their underground nest around it. Skunks chew up the bodies of bees and hornets and swallow their juices, but they spit out the hard, non-juicy insect parts on the ground. Now you know.

The striped skunk is found just about everywhere in the United States and Southern Canada. They are housecat size and a big one might weigh 10 pounds. Lucky skunks may live 10 years, but most of them never reach half that age. Four or five youngsters are a typical litter of skunks (kits) born in the Spring. They stay with their mother until Fall and can breed the following Spring. Skunks are pretty much solitary animals except during the breeding season. They don't hibernate. Their sense of smell is excellent, but their eyesight is decidedly poor.

A fence will keep skunks away from your hives, but raising your colonies on a hive stand taller than a skunk can reach, about 18" or so, is easier.

Besides bees, skunks eat just about everything that is available – like reptiles, mice, worms, grubs, crickets, bird's eggs, fruit, berries, fish, and all sorts of leftover human food. They are a problem for folks that raise poultry on a casual basis, consuming eggs and sometimes killing chickens in the night.

If you look closely at a skunk's front feet you can see that their big, sharp toenails are perfectly equipped for serious digging. They can dig their own dens, although they seem to like to improve on ones dug by other wild creatures – under porches, tree stumps and woodpiles – those sorts of places. Their footprints in the snow or mud look somewhat similar to those of a domestic cat with huge toenails – except cats always retract their sharp nails completely while they walk.

Skunks are well known (sometimes primary) carriers of rabies, as well as a number of other serious diseases, like distemper and tularemia. Seeing a skunk wandering around in broad daylight is serious business and a reason for concern. Skunks also are often burdened with fleas and ticks as well as numerous internal parasites. I don't think anyone really considers them desirable neighbors, especially beekeepers, pet owners, gardeners and those who raise poultry.

When you think about it, cottontail rabbits and woodchucks (or groundhogs some people call them) live their entire lives without ever having a drink of water. They get sufficient moisture from the lush vegetation they consume. Skunks, however, need to drink water regularly, so their home territory must include a stream or body of water. Their home territory is thought to be a square mile more or less.

Skunks can't climb worth a darn, so even a three foot high fence around an apiary, garden or chicken coop will exclude them. Remember though, those big front toenails can dig under a fence in a hurry, so at least six inches of the wire must be buried, the underground part preferably at an outward angle.

It seems to me that skunks are not nearly as common as they were years ago, at least where I am. I don't know why. But, it's a good thing for beekeepers. And, I'm here to tell you, skunk problems are a whole lot easier than bear problems to deal with and remedy!

Dan Stiles is a retired wildlife biologist in West Virginia.

GLEANINGS

FEBRUARY, 2010 • ALL THE NEWS THAT FITS

MEDHAT NASR RECEIVES AWARD

Alberta Provincial Apiculturist, Dr. Medhat Nasr, is the recipient of the Distinguished Achievement Award from Alberta Beekeepers Commission and was honored at the Annual General Meeting of Alberta Beekeepers Commission on Wednesday November 4, 2009. Dr. Nasr is an internationally recognized expert on honey bee pest management.

MILTON CARLYLE KNOEFLER

One of Southern California's Pioneer beekeepers, Milton Carlyle Knoefler of Riverside, CA passed away Monday, April 27, 2009 at the Corona Regional Hospital, at the age of 90.

Born in Clyde, TX on April 15, 1919 to parents George and Lois Knoefler, Milton was the 6th of 9 children.

At a young age, Milton discovered a passion for keeping bees, and began his own business. Soon after, on Dec 1st, 1946, Milton married his sweetheart Joyce Booth. Together, they developed a highly successful honey business, Knoefler and Sons Honey Inc., which became one of the largest beekeeping businesses in Southern California. Milton diligently worked in the bees for over 60 years.

Milton Knoefler was well known throughout the bee keeping industry. He helped a number of beekeepers make their start, whether as their employer or as their mentor. Milton will be deeply missed by all who had the privilege of knowing this extraordinary man.

Preceding him in death were sons, Walter and Dennis Knoefler, his daughter Irene Pollard and five brothers Vincent, Wilbert, Ray, Kenneth, Albert G. and one sister Naola Ferdinand.. He is survived by his loving wife Joyce Knoefler, son David Knoefler, brothers Donald and Harold W, Knoefler, nine grandchildren, and eight great-grandchildren.

DR. E.C. (Bert) MARTIN

The beekeeping world lost a true friend, scholar, and advocate when Bert died on January 2, 2009. Even though he had a full and active life, it is still hard to have such wonderful people leave us. In his 99 years he did impact many people and beekeepers throughout the world, but especially the Provinces of Ontario and Manitoba in Canada and the State of Michigan.

Bert was born in Liverpool, England on November 1, 1910, though his family emigrated to Ontario, Canada when he was just two years old. He graduated from the University of Toronto (Ontario Agricultural College) in 1933 and remained at O.A.C. for a couple of years as an assistant in the Apiculture Department. After graduate studies at Cornell University he became a faculty member at the University of Manitoba. During WW II he served in the Canadian navy as a Lt. Commander on a mine sweeper. His ship helped remove mines from the Normandy beaches on D-Day. After the war he returned to Manitoba as the Provincial Entomologist until he was hired by Michigan State University to be an Apiculture Professor and Extension Specialist in 1950. He remained at MSU until 1975 when he retired to take a position as Program Leader for Crop Pollination, Bees and Honey f0r the U.S.D.A. in Washington, D.C. He held this position until 1979 when he again retired to live in Green Valley, Arizona.

During his tenure at MSU he was asked to serve as Science Dean at the newly developing university in Nsuka, Nigeria. During this two-year assignment he helped design buildings, hire science faculty and generally establish a new university for this developing country. He repeated this effort, on a more limited scale, for a university in Indonesia some years later.

I can best describe the kind of person, professor, advisor, mentor, and friend that Bert was by quoting from a recommendation by Dr. James Bath who was Chairperson of the Department of Entomology during part of his tenure at Michigan State.

"Dr. Martin is one of the all-around finest individuals I have ever met. He is very understanding, logical, sensible, tolerant, patient and conscientious. He is a master at getting the most out of people, and he is a joy to work with."

Bert is survived by his wife, Grace (Ronny), who he was married to for 69 years, three children and several grandchildren and great-grandchildren.

He will be greatly missed by all of us that he touched during his long and productive life.

Roger Hoopingarner
Holt, Michigan

FOREIGN NEWS

BEES & TRACTORS TEAM UP

UK agricultural equipment manufacturer New Holland is joining the fight to find solutions to the problems causing dramatically high losses of Britain's honeybees.

As well as providing essential funding, New Holland, owned by Dutch registered CNH Global N.V., will use its extensive dealer network and customer base to support the aims of the British Beekeepers' Association (BBKA).

The partnership with the BBKA will see New Holland have stands at key agricultural shows and events where it can raise awareness of the work of the BBKA amongst farmers, land-owners and contractors.

The Lincolnshire Agricultural Machinery Manufacturers Association Show on Jan, 20 and 21 will mark the official launch of the link between the BBKA and New Holland.

New Holland also plans to help promote the BBKA's key aims to educate the public on the importance of bees in the environment and the impact they have on food security.

The crisis wiped out a third of British bee colonies in the winter of 2007/8 alone and New Holland says this could have a serious impact on the livelihoods of Britain's farmers.

New Holland marketing manager Richard Spencer says this is a problem that New Holland is taking very seriously:

"Becoming a corporate member of the BBKA is a logical step for New Holland," Spencer says. "Our products are used to harvest crops such as oilseed rape: our specialist tractors are designed for orchards, for example. It's clear the customers who use these machines also rely on honey bees for their livelihoods."

Alan Harman

ASIAN HORNET MOVING

British beekeepers are reported bracing for a new pest invasion, this time of bee-eating Asian hornets that are already rapidly spreading through France.

The hornets, which arrived in France from the Far East in a consignment of pottery in late 2004, can grow to 1.8 inches in length and has a wingspan of three inches.

The bites from the hornets with the scientific name *Vespa velutina* have been compared to a hot nail entering the body.

French beekeepers say the hornets have been sighted in Paris for the first time and some say they could eventually reach Britain.

The hornets lurk near hives and capture honey bees in flight and devour them.

National Institute for Agricultural Research specialist Denis Thiery tells reporters the hornets are likely to push on with a relentless colonization of France and then other European states.

"We are seeing a real geographical expansion," he says.

Beekeepers in south-western France say the hornet population is growing every year.

"We have literally been invaded," beekeeping official Raymond Saunier says. "All it takes is two or three hornets near your hive and you've had it."

Thousands of football-shaped hornet nests have been documented around the city of Bordeaux alone and entomologists says neither pesticides nor traps have proved particularly effective, largely because the creatures nest high off the ground in trees.

The hornet has no natural predators in Europe.

The fear is the hornets will eventually cross the Channel to southeast England.

The Natural History Museum insect identification service manager Stuart Hine says a UK invasion is very likely, but is a long way off, although with the predicted increase to European temperatures in 10-15 years time, this may be possible.

"If anything were to stop them it would be the good, old-fashioned British summers. They wouldn't cope well with heavy rain," he says.

Alan Harman

MORE CERANA FOUND IN AUSTRALIA

Australian biosecurity workers have found the 50th Asian honey bee (*Apis cerana*) nest in far north Queensland as the more than two-year fight to eliminate the invaders moves to a new area.

Queensland state Primary Industries Minister Tim Mulherin says the latest nests were discovered by the Australian Quarantine and Inspection Service and a local council.

"One infestation was found on a business premises in the Cairns industrial suburb of Portsmith," he says. "It was the 50th Asian honey bee infestation found since the pest was first detected in Cairns more than two years ago." The nest was destroyed along with another infestation at Greenhill.

Earlier, the Yarrabah Aboriginal Council's head ranger reported a swarm of foraging Asian Honey bees in the Yarrabah area, about 10 miles southeast of Cairns.

Mulherin says the nest, the first detection in the Yarrabah area, was found among mangroves and was destroyed.

"We have now destroyed 52 Asian honey bee nests and Biosecurity Queensland is determined to seek and destroy every infestation," he says.

The state Department of Primary Industries found the bees on a yacht in Cairns harbor in May, 2007. It is believed the species reached Australia on a freight ship and then colonized the yacht.

Biosecurity Queensland surveillance manager Wim De Jong says it is important to track Asian Honey bee nests before the wet season sets in.

"The swarm found at Yarrabah was relatively small," De Jong says. "The Yarrabah council's swift response has helped Biosecurity Queensland get close to finding the possible source nest."

Another setback, in January, for the campaign to eradicate an Asian honey bee incursion with a second swarm detected in Queensland's Tablelands some 40 miles southwest of the original discovery two and a half years ago in Cairns.

Biosecurity Queensland destroyed the swarm after a local resident reported it and is urging residents to join in the search for the invaders.

Asian honey bee eradication program coordinator Charlotte Greer says the swarm is the second infestation of Asian honey bees (Apis cerana) discovered on the Tablelands since the first find in Cairns.

"We destroyed a swarm near Mareeba in August last year and have maintained surveillance on the Tablelands since then," Greer says. "We don't believe the Lake Eacham swarm is directly connected to the Mareeba infestation, which was 38km (24 miles) away."

The bees were found outside the original restricted area in Cairns and, following some intensive surveillance, it is believed they may have been inadvertently moved to Mareeba on heavy equipment such as a container.

Greer says Biosecurity Queensland field teams are ramping up intensive surveillance of the Lake Eacham area.

A restricted area has been expanded to cover about 15 miles in radius around Mareeba.

Movements will be allowed into and within the restricted area under permit but will not be allowed out of the area except under exceptional circumstances.

Biosecurity Queensland says a total of 46 nests and swarms have been located and destroyed in northern Queensland since the first discovery was made in May 2007 when Asian bees were found in the mast of a yacht in dry dock.

The strain of Asian honey bees found in Cairns is the Java strain, common in Asia, especially in Indonesia and Papua New Guinea.

Tests on the bees and on comb from the nests indicate none of the nests destroyed to date carried any exotic *Varroa* mites, Tropilaelaps mites or Tracheal mites. DNA testing indicates all the nests are related to each other and there has only been the one incursion from overseas.

A restricted area is also in place around Cairns until the Asian honey bees can be eradicated.

Greer tells the Australian Associated Press news agency authorities are nonplussed that swarms are appearing on the Atherton Tableland.

"It's so far away from everything, that's the shock to us," she says. "We're just scratching our heads as to how the bloody hell it got there, but we're very keen to find out."

Alan Harman

QUESTIONABLE SURVEYS

A new report on bee mortality in Europe says the poor quality of surveillance systems in the region makes it hard to assess colony loss rate.

It was found colony loss surveillance systems in Europe are characterized by a variety of the approaches, but the majority shared common aspects – the weakness of the systems implemented, and the lack of representative data produced.

"An appropriate tool to monitor colony losses at a European level is important since it will provide national and European decision makers, and also the beekeeping industry, with accurate figures about colony mortality which, in turn could focus control and research activities," the researchers say.

The European Food Safety Authority (EFSA) funded the study, which was carried out by a consortium of scientific institutes led by the French national food safety agency Agence Francaise de Sécurité Sanitaire des Aliments.

The researchers created a standardized surveillance network assessment tool (SNAT) to analyze the European colony loss surveillance programs.

This was sent to 27 European Economic Area countries and 25 SNATs from 24 countries were completed, received and processed. Two countries, Ireland and Portugal, had no surveillance system in place and Romania provided no answers.

The SNAT analysis allowed the countries to be classified into four categories: those with a very good level of compliance with the standards of a good operating system (1 system), an upper intermediate level of compliance (4 systems), (iii) a lower intermediate level of compliance (12 systems) and a low level of compliance (8 systems).

The report says 80% of the surveillance systems were found to comply with less than 50% of the 40 items covered by the questionnaire.

"This generally low level of compliance reflects a broad margin for improvement in most of the European surveillance systems considered within the project," the report says. "Concerning surveillance procedures and protocols, of the 18 systems stating that they have in place active surveillance procedures, only six can be considered as valid active systems able to produce representative figures of the colony loss situation for the countries in question."

The only indicator that appeared to be commonly used was the "global colony loss rate" during the over-wintering period. Thus not all aspects of colony losses – such as summer losses – could be addressed.

"Temporal and geographical analyses showed an important variability in colony losses," the report says. "However, such trends are difficult to interpret considering the wide variation in the quality of the systems that produce these data."

Nevertheless, the project noted a baseline colony loss rate around 10% each year at the European level and a higher rate of colony loss in some countries during the years 2003 and 2008.

"Trend analysis and mapping suggests some periods of higher colony loss rates, but these findings should not be over interpreted," the report says. "They serve to illustrate the fact that existing data collection systems are not robust enough for between-country comparisons across Europe, or the analysis of trends at the European level."

The researchers advocate the improvement of the surveillance systems and produced a set of 20 recommendations, designed to enhance honey bee surveillance systems.

They say further studies are needed to better understand the factors that affect honey bee health.

Alan Harman

RESISTANT VARROA IN NEW ZEALAND

New Zealand's leading pollination researcher calls for a ban on moving bees or beekeeping equipment between the country's two main islands because of the discovery of miticide resistant *Varroa* in the North Island.

Plant & Food Research scientist Mark Goodwin, the 2009 Researcher of the Year for his work on pollination research, says for beekeepers and those requiring pollination services the difference between *Varroa* and no *Varroa* is much smaller than the difference between *Varroa* and resistant *Varroa*.

"At the moment we are doing absolutely nothing to stop someone bringing resistant *Varroa* down from the North Island," Goodwin tells the Rural News farm newspaper.

He says *Varroa* can be managed, but once it becomes resistant to miticides, evidence from elsewhere in the world shows beekeeping on a commercial scale becomes an uphill battle.

Alan Harman

ONE MORE STORY IN THE NAKED CITY – NEW YORKERS WANT BEEKEEPING LEGAL

New York City is moving to end a usually ignored ban on beekeeping within city limits.

Honey bees have been included with lions, pit vipers, crocodiles and other animals banned because they were claimed to be naturally inclined to do harm. Bees were added to the list of dangerous critters in 1999.

Now the Board of Health is proposing an amendment to the New York City Health Code to allow beekeeping as part of the movement to encourage urban agriculture.

The board set Feb. 3 for a public hearing on the proposal.

In response to a petition from a group wanting to promote beekeeping as sustainable agriculture, the department examined reports of bee stings and found that such incidents are minimal.

"The Health Department looked into urban beekeeping and found that responsible urban beekeeping does not pose a public health issue," it says.

As a result the department is proposing an amendment to allow New Yorkers to keep hives of non-aggressive honey bees.

No permit will be required, but beekeepers will be required to file a notice with the department containing the beekeeper's name, address, telephone, e-mail and fax numbers, emergency contact information, and location of the hive. The department will have to be told of any changes to this information.

The proposed change will also require beekeepers to adhere to appropriate beekeeping practices including maintaining bee colonies in moveable-frame hives that are kept in sound and usable condition; providing a constant and adequate water source; locating hives so the movement of bees does not become an animal nuisance; and be able to respond immediately to control bee swarms and to remediate nuisance conditions.

The New York City Beekeepers Association had previously organized a petition to lift the ban on bees and put New York in the same position as Atlanta, Chicago, Portland, San Francisco, Seattle, Toronto, and Vancouver, which all allow beekeeping within city limits.

The association says honeybees are garden heroes that help gardens grow more fruit and vegetables and contribute to productive harvests in community gardens, public parks and nature centers.

The association's website carries a disclaimer:

"Bees are classified as wild animals under New York City Health Code Section 161 and may not be privately kept without approval of the Department of Health. This organization is dedicated to expanding the knowledge of bees and beekeeping and does not condone or promote the violation of this or any other city ordinance."

Alan Harman

MANUKA, OR NOT MANUKA NOT ALL HONEY IS THE SAME

The Active Manuka Honey Association has criticized a new standard released by Waikato University for measuring the anti-bacterial activity in manuka honey.

The association controls the use of the unique manuka factor trademark used to certify manuka honey products and has 32 licence holders.

The new standard was devised by Peter Molan who first identified the anti-bacterial properties in manuka.

Molan says the surging global demand for manuka honey is creating a major ethical concern in the way it is being marketed to consumers.

As a result, he is putting his name to the Molan Gold Standard, a new standard that defines manuka honeys with the unique bioactivities identified in his research.

Molan also developed the test used by the association, but the university says the new standard is based on a more accurate test.

Association brand manager John Rawcliffe says there is a danger of confusing consumers if there are multitude of standards.

He says the university is being misleading as it is offering only a new testing method rather than a comprehensive standard.

The association says the university's move undermines an industry review that is attempting to resolve arguments over labeling and testing.

"Not all manuka honeys have true medicinal bioactivity beyond the range that's normal of all honeys and the industry is exposed if it does not make the distinction," he says.

"Several manuka honeys called 'active' in combination with a number have little or none of the non-peroxide activity that is the key to its distinct antibacterial qualities."

He says he is concerned non-medical-grade manuka honeys could be used for medicinal purposes by unknowing consumers.

University of Waikato vice-chancellor Roy Crawford says the university did not hesitate to back Molan's new standard because it will help consumers.

"Peter created this NZ$100-million-a-year industry and now consumers will be guaranteed quality thanks to this Molan Gold Standard," Crawford says.

Alan Harman

Display Advertisers

I recently received a newspaper clipping from a friend living in southern California, titled *The Secret Lives of Beekeepers*. The author attended a bee club meeting. She interviewed several beekeepers who asked to remain anonymous. These urban beekeepers don't offer free jars of honey to neighbors. They conceal their hives behind bushes or on rooftops. The beekeepers "meet at night" and keep their activities "under the radar".

Journalists learn in college to approach their subject from an "angle". In this case, the public's fear of bees forces beekeepers to keep their hobby a secret from their neighbors. Another article from my mother-in-law in New Hampshire used a mystical angle – *the ancient art of beekeeping*—"rhythms of birth and renewal" and "smoke, like incense, wafts over the combs..." My sister clipped an article from the Geneva Times several years ago – *Beekeeping, a Dying Craft*, referring to apiculture as practiced by a "dwindling breed of old men."

The common denominator running through these articles is the mysterious nature of beekeeping. Beekeepers are like a secret society, possessing wisdom that goes back to the ancient Egyptians, Babylonians, and Assyrians – sort of like Apicultural Freemasonry.

I like the way writers portray beekeepers. If you don't have to hide your bees, if you've sufficiently bribed your neighbors or if your bees live in a remote location, you can still take advantage of this aura of mystery spread by the media.

When I answer a swarm call, I often arrive to find a small crowd of onlookers. Over their lifetimes they've probably read several of these beekeeping articles. They gasp as I thrust my bare hands into the swarm and slowly draw them out, covered with bees. They draw back as I shake them into a swarm box, stirring up a cloud of bees.

With an audience, swarm catching becomes performance art and the beekeeper a performance artist. Performance art works are short, usually lasting no more than 15 minutes. The artist plays to and interacts with a small crowd. The results of performance art can be unpredictable but usually memorable. Critics describe my work as Post-Minimalist – "boldly delineating and defining the physical and temporal relationship of the viewer to the Art."

Like a magician, I like to have a beautiful female assistant, usually my daughter, Ariele. She hands me a cardboard box. With a snap of my wrist, I transfer the bees into the box and give it back to her.

"How do you know when you have caught the queen?" one woman asks.

"The bees tell me," I answer, meaning the bees cluster on the screen or enter the box when the queen is inside.

She turns to her husband, who is standing 10 yards further back to avoid getting stung. "Did you hear what the man said, Harry? He said the bees talk to him!"

Ariele puts the swarm box in the back of the van, loose bees and all. "They'll drive home in a cloud of bees," Harry tells Bernice.

With a slight bow and, if I'm lucky, a modest transfer of money in my direction, we depart.

At one swarm call, the man was allergic and the woman frightened that the bees were about to move into their house. Ariele and I did our routine, then I scanned the area and pointed out a small hole through the forest canopy, thirty feet high in a basswood tree about 100 feet away. "There's where your swarm came from," I said. Swarms almost always land within a line of sight from the entrance of their old nest. People don't know that, so I create the illusion of possessing something like clairvoyance. If I can't see the parent colony, I don't mention it.

Shocked, amazed, and relieved, the couple asked what they owed me. "Oh, $10 to cover gas would help." I answered. "Thanks."

On the drive home Ariele looked perplexed. "That was weird. I've been around bees all my life and never realized people could be that afraid of them. They acted like you have special powers."

"When terror strikes, the mild mannered Mr. Sieling briskly steps into the nearby phone booth and removes jacket and tie. Stripped of extraneous distractions, figural and metaphorical reference, detail, or ornament, the Artist emerges to confront the nihilistic existentialism of Post Modernism's archetypal paradigm!"

"Yeah, Dad. Just keep the wheels of your bee-mobile in your own lane and slow down. We don't need an accident with a box of bees in the van."

Peter Sieling

Portrait Of The Artist As An Older Man