



# BEE NEWS & VIEWS

The Mississippi Beekeepers Association Newsletter

JEFF HARRIS, Editor  
Phone: 662.325.2976

March-April 2013

## Nanoparticles Loaded with Bee Venom Kill HIV

By Julia Evangelou Strait

Nanoparticles carrying a toxin found in bee venom can destroy human immunodeficiency virus (HIV) while leaving surrounding cells unharmed, researchers at Washington University School of Medicine in St. Louis have shown. The finding is an important step toward developing a vaginal gel that may prevent the spread of HIV, the virus that causes AIDS.

“Our hope is that in places where HIV is running rampant, people could use this gel as a preventive measure to stop the initial infection,” says Joshua L. Hood, MD, PhD, a research instructor in medicine.

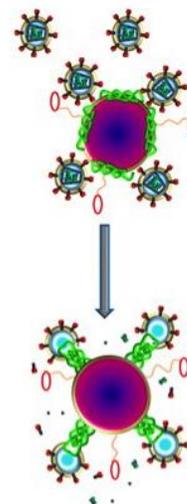
The study appears in the current issue of *Antiviral Therapy*.

Bee venom contains a potent toxin called melittin that can poke holes in the protective envelope that surrounds HIV, and other viruses. Large amounts of free melittin can cause a lot of damage. Indeed, in addition to anti-viral therapy, the paper’s senior author, Samuel A. Wickline, MD, the J. Russell Hornsby Professor of Biomedical Sciences, has shown melittin-loaded nanoparticles to be effective in killing tumor cells.

The new study shows that melittin loaded onto these nanoparticles does not harm normal cells. That’s because Hood added protective bumpers to the nanoparticle surface. When the nanoparticles come into contact with normal cells, which are much larger in size, the particles simply bounce off. HIV, on the other hand, is even smaller than the nanoparticle, so HIV fits between the bumpers and makes contact with the surface of the nanoparticle, where the bee toxin awaits.

“Melittin on the nanoparticles fuses with the viral envelope,” Hood says. “The melittin forms little

pore-like attack complexes and ruptures the envelope, stripping it off the virus.”



JOSHUA L. HOOD, MD, PHD

Nanoparticles (purple) carrying melittin (green) fuse with HIV (small circles with spiked outer ring), destroying the virus’s protective envelope. Molecular bumpers (small red ovals) prevent the nanoparticles from harming the body’s normal cells, which are much larger in size.

According to Hood, an advantage of this approach is that the nanoparticle attacks an essential part of the virus’ structure. In contrast, most anti-HIV drugs inhibit the virus’s ability to replicate. But this anti-replication strategy does nothing to stop initial infection, and some strains of the virus have found ways around these drugs and reproduce anyway.

“We are attacking an inherent physical property of HIV,” Hood says. “Theoretically, there isn’t any way for the virus to adapt to that. The virus has to have a protective coat, a double-layered membrane that covers the virus.”

Beyond prevention in the form of a vaginal gel, Hood also sees potential for using nanoparticles with melittin as therapy for existing HIV infections, especially those that are drug-resistant. The nanoparticles could be injected intravenously and, in theory, would be able to clear HIV from the blood stream.

“The basic particle that we are using in these experiments was developed many years ago as an artificial blood product,” Hood says. “It didn’t work very well for delivering oxygen, but it circulates safely in the body and gives us a nice platform that we can adapt to fight different kinds of infections.”

Since melittin attacks double-layered membranes indiscriminately, this concept is not limited to HIV. Many viruses, including hepatitis B and C, rely on the same kind of protective envelope and would be vulnerable to melittin-loaded nanoparticles.

While this particular paper does not address contraception, Hood says the gel easily could be adapted to target sperm as well as HIV. But in some cases people may only want the HIV protection.

“We also are looking at this for couples where only one of the partners has HIV, and they want to have a baby,” Hood says. “These particles by themselves are actually very safe for sperm, for the same reason they are safe for vaginal cells.”

While this work was done in cells in a laboratory environment, Hood and his colleagues say the nanoparticles are easy to manufacture in large enough quantities to supply them for future clinical trials.

#### Reference:

Hood JL, Jallouck AP, Campbell N, Ratner L, Wickline SA. Cytolytic nanoparticles attenuate HIV-1 infectivity. *Antiviral Therapy*. Vol. 19: 95 - 103. 2013

This work was supported by the Bill & Melinda Gates Foundation Grand Challenges Explorations grant number OPP1024642 ‘Fusogenic nanoparticles for combined anti-HIV/contraception.’

## **Mystery Malady Kills More Bees, Heightening Worry on Farms**

*By Michael Wines*

*Published: New York Times, March 28, 2013*



Jim Wilson/The New York Times

**A Disastrous Year for Bees:** For America’s beekeepers, who have struggled for nearly a decade with a mysterious malady called colony collapse disorder that kills honeybees en masse, the last year was particularly bad.

BAKERSFIELD, Calif. — A mysterious malady that has been killing honey bees en masse for several years appears to have expanded drastically in the last year, commercial beekeepers say, wiping out 40 percent or even 50 percent of the hives needed to pollinate many of the nation’s fruits and vegetables.

A conclusive explanation so far has escaped scientists studying the ailment, colony collapse disorder, since it first surfaced around 2005. But beekeepers and some researchers say there is growing evidence that a powerful new class of pesticides known as neonicotinoids, incorporated into the plants themselves, could be an important factor.

The pesticide industry disputes that. But its representatives also say they are open to further studies to clarify what, if anything, is happening. “They looked so healthy last spring,” said Bill Dahle, 50, who owns Big Sky Honey in Fairview, Mont. “We were so proud of them. Then, about the first of September, they started to fall on their face, to die like crazy. We’ve been doing this 30 years, and we’ve never experienced this kind of loss before.”

In a show of concern, the Environmental Protection Agency recently sent its acting assistant administrator for chemical safety and two top chemical experts here, to the San Joaquin Valley of California, for discussions.

In the valley, where 1.6 million hives of bees just finished pollinating an endless expanse of almond groves, commercial beekeepers who only recently were losing a third of their bees to the disorder say the past year has brought far greater losses.

The federal Agriculture Department is to issue its own assessment in May. But in an interview, the research leader at its Beltsville, Md., bee research laboratory, Jeff Pettis, said he was confident that the death rate would be “much higher than it’s ever been.”

Following a now-familiar pattern, bee deaths rose swiftly last autumn and dwindled as operators moved colonies to faraway farms for the pollination season. Beekeepers say the latest string of deaths has dealt them a heavy blow.

Bret Adee, who is an owner, with his father and brother, of Adee Honey Farms of South Dakota, the nation’s largest beekeeper, described mounting losses.

“We lost 42 percent over the winter. But by the time we came around to pollinate almonds, it was a 55 percent loss,” he said in an interview here this week.

“They looked beautiful in October,” Mr. Adee said, “and in December, they started falling apart, when it got cold.”

Mr. Dahle said he had planned to bring 13,000 beehives from Montana — 31 tractor-trailers full — to work the California almond groves. But by the start of pollination last month, only 3,000 healthy hives remained.

Annual bee losses of 5 percent to 10 percent once were the norm for beekeepers. But after colony collapse disorder surfaced around 2005, the losses approached one-third of all bees, despite beekeepers’ best efforts to ensure their health.

Nor is the impact limited to beekeepers. The Agriculture Department says a quarter of the American diet, from apples to cherries to watermelons to onions, depends on pollination by honeybees. Fewer bees mean smaller harvests and higher food prices.

Almonds are a bellwether. Eighty percent of the nation’s almonds grow here, and 80 percent of those are exported, a multibillion-dollar crop crucial to California agriculture. Pollinating up to 800,000 acres, with at least two hives per acre, takes as many as two-thirds of all commercial hives. This past winter’s die-off sent growers scrambling for enough hives to guarantee a harvest. Chris Moore, a beekeeper in Kountze, Tex., said he had planned to skip the groves after sickness killed 40 percent of his bees and left survivors weakened.

“But California was short, and I got a call in the middle of February that they were desperate for just about anything,” he said. So he sent two truckloads of hives that he normally would not have put to work.

Bee shortages pushed the cost to farmers of renting bees to \$200 per hive at times, 20 percent above normal. That, too, may translate into higher prices for food.

Precisely why last year’s deaths were so great is unclear. Some blame drought in the Midwest, though Mr. Dahle lost nearly 80 percent of his bees despite excellent summer conditions. Others cite bee mites that have become increasingly resistant to pesticides. Still others blame viruses.

But many beekeepers suspect the biggest culprit is the growing soup of pesticides, fungicides and herbicides that are used to control pests.

While each substance has been certified, there has been less study of their combined effects. Nor, many critics say, have scientists sufficiently studied the impact of neonicotinoids, the nicotine-derived pesticide that European regulators implicate in bee deaths.

The explosive growth of neonicotinoids since 2005 has roughly tracked rising bee deaths.

Neonics, as farmers call them, are applied in smaller doses than older pesticides. They are systemic pesticides, often embedded in seeds so that the plant itself carries the chemical that kills insects that feed on it.

Older pesticides could kill bees and other beneficial insects. But while they quickly degraded — often in a matter of days — neonicotinoids persist for weeks and even months. Beekeepers worry that bees carry a summer's worth of contaminated pollen to hives, where ensuing generations dine on a steady dose of pesticide that, eaten once or twice, might not be dangerous.

“Soybean fields or canola fields or sunflower fields, they all have this systemic insecticide,” Mr. Adee said. “If you have one shot of whiskey on Thanksgiving and one on the Fourth of July, it’s not going to make any difference. But if you have whiskey every night, 365 days a year, your liver’s gone. It’s the same thing.”

Research to date on neonicotinoids “supports the notion that the products are safe and are not contributing in any measurable way to pollinator health concerns,” the president of CropLife America, Jay Vroom, said Wednesday. The group represents more than 90 pesticide producers. He said the group nevertheless supported further research. “We stand with science and will let science take the regulation of our products in whatever direction science will guide it,” Mr. Vroom said.

A coalition of beekeepers and environmental and consumer groups sued the E.P.A. last week, saying it exceeded its authority by conditionally approving some neonicotinoids. The agency has begun an accelerated review of their impact on bees and other wildlife.

The European Union has proposed to ban their use on crops frequented by bees. Some researchers have concluded that neonicotinoids caused extensive die-offs in Germany and France.

Neonicotinoids are hardly the beekeepers’ only concern. Herbicide use has grown as farmers have adopted crop varieties, from corn to sunflowers, that are genetically modified to survive spraying with

weedkillers. Experts say some fungicides have been laced with regulators that keep insects from maturing, a problem some beekeepers have reported.

Eric Mussen, an apiculturist at the University of California, Davis, said analysts had documented about 150 chemical residues in pollen and wax gathered from beehives.

“Where do you start?” Dr. Mussen said. “When you have all these chemicals at a sublethal level, how do they react with each other? What are the consequences?”

Experts say nobody knows. But Mr. Adee, who said he had long scorned environmentalists’ hand-wringing about such issues, said he was starting to wonder whether they had a point.

Of the “environmentalist” label, Mr. Adee said: “I would have been insulted if you had called me that a few years ago. But what you would have called extreme — a light comes on, and you think, ‘These guys really have something. Maybe they were just ahead of the bell curve.’”

## **BIP and Winter Colony Loss Survey**

*By Karen Rennich*

The Bee Informed Partnership, a joint project among numerous universities and laboratories, is a project whose aim is to help beekeepers make better management decisions and thus reduce colony losses. To do this effectively, we need beekeepers, lots of beekeepers, to participate in our survey. We are asking you to please participate in two surveys. Both surveys are open only from 29 March through 15 April 2013.

You can learn more about the Bee Informed Partnership at [beeinformed.org](http://beeinformed.org).

Please click on the link below or paste it into your browser to participate in the National Winter Loss and Management Survey:

<http://10.selectsurvey.net/beeinformed/TakeSurvey.aspx?SurveyID=BIP2012>

The winter loss survey should take less than 5 minutes and the management survey should take less than 20 minutes.

The purpose of the Bee Informed Partnership is to use beekeepers' real world experiences to help solve beekeepers' real world problems. We will use the data generated from these two surveys to help you decide which management practices are best for beekeepers like you, who live where you do and have operations similar to yours. For this to work, we need as many participants as possible...so please take the time to fill out the questionnaire and **SEND THIS EMAIL TO ALL THE BEEKEEPERS YOU KNOW** asking them to fill out these questionnaires too.

You can see what type of results we will generate by visiting the [Beeinformed.org](http://Beeinformed.org) website and browsing through our results section. Currently we are in the process of posting last year's management results, so visit the site often to see these results as they are posted and discussed in our BLOG section.

Depending on the number of participants we hope to have the results from this year's survey broken down by region and should have those results posted within months of the survey close date now that we have built the infrastructure needed to automate report generation.

Should you have any questions or concerns please do not hesitate to contact us at [askbeeinformed@gmail.com](mailto:askbeeinformed@gmail.com) or call us at 443.296.2470.

You can learn more about the Bee Informed Partnership at [beeinformed.org](http://beeinformed.org).

**Beginners Workshop by the  
Central Mississippi Beekeepers  
Association**  
*By Jeff Harris*

The CMBA held a 1.5-day beginning beekeeping workshop at the Agriculture and Forestry Museum in Jackson, MS on March 1-2, 2013. Over 135 people attended the event despite the relatively cold weather.

The workshop began with opening remarks from Ben Kern and Harry Hughes, members and officers of the CMBA. Cindy Hyde-Smith, Mississippi Agricultural Commissioner, followed them with a warm welcome to the beekeepers. She extolled the importance of agriculture to the Mississippi economy and relayed some proposals for renovations to the Agricultural and Forestry Museum. She also described her upbringing as a farmer, and rejoiced that her daughter is now a 5<sup>th</sup> generation farmer!

The bulk of the first day involved various lectures and hands-on demonstrations. Jerry Latner (Dadant & Sons, Florida) and Harry Hughes presented the basic beekeeping equipment to the audience. They assembled a standard Langstroth hive from the bottom up, describing the functions of the various hive components as they progressed. They also discussed beekeeping jargon and terms and demonstrated the use of personal protective equipment.



Jerry Latner (foreground) and Harry Hughes (reddish shirt, standing) teaching the basics of standard hive equipment at the CMBA Beginning Beekeeping Workshop.

I followed this session with a couple of power point presentations. The first covered the basic biology and social organization of a colony of bees with an emphasis on the major roles of queens, workers and drones. The second described the different ways of starting colonies of bees from nucs, packages or by splitting existing hives. I also covered the basics of apiary location and tips for reducing problems with neighbors.

A boxed lunch was provided to everyone, and the lunch hour was used as a time for stimulating conversation between new beekeepers and mentors.

This was facilitated by assigning small groups of the attendees to sit and eat with a specific mentor within the dining hall. All participants were encouraged to ask questions and talk freely with their mentor.

After lunch Derwin Thrash and Michael Everitt team taught the basics of finding queens in hives, requeening hives and the importance of keeping young queens in colonies. They continued with a second afternoon session outlining the basics of seasonal management in beekeeping, stressing the importance of swarm management for honey production. Their discussion included summer management, harvesting the honey crop, and preparing colonies to survive the winter.

Walter McKay (CMBA President) followed this session with a hands-on demonstration of harvesting honey. He described the use of a bee escape to passively remove adult worker bees from honey supers, but he also told of the use of fume boards to quickly repel bees from supers. He also demonstrated uncapping of honey combs over a special tub designed for the purpose before showing how a mechanical extractor is used to sling honey out of the combs.

The first day ended with a power point presentation about enemies of the hive by me. I focused primarily on the most destructive parasite (e.g. Varroa mites) and bacterial disease (American foulbrood) that affect bees; however, I also described the life history of the tracheal mite, fungal diseases like chalkbrood, and other minor problems in bee hives.

Originally, the intent of the second day was to get participants and their mentors into live colonies of bees. The goal was to examine colonies and to discuss everything that could be imagined while looking at real bees. However, the very cold weather forced us to stay inside.

The morning began with a very useful discussion of beekeeping terms and concepts that were not fully understood during the previous day. Harry Hughes led this question and answer session. Afterwards, a film called "Honey Bee Blues" was shown to the audience. The Australian film explained the severity of Varroa mites as a killer of honey bees

around the world. The film provided much insight into the problems that plague commercial beekeeping these days. The morning ended when Michael Everitt and Derwin Thrash presented various photos of queen honey bees and various conditions that can be commonly seen in colonies of bees.

The CMBA beginner's workshop has been an annual event for several years, and it seems likely that it will continue for many more. If the attendance continues to grow, we will need a larger venue for hosting the event! The workshop was successful if only gauged by the general feeling of friendship that pervaded the group of participants and mentors throughout the day.

## **Pollinator Workshop at the Grand Bay NERR**

*By Jeff Harris*

A "Bee Wise" pollinator workshop was conducted at the Grand Bay National Estuary Research Reserve on March 15-16, 2013. The event was organized by Jennifer Buchanan, the education and outreach coordinator for the facility. The primary purpose was to understand the importance of insect pollinators and to encourage people to provide nesting sites for native bees. Additionally, the basics of beekeeping were provided for people with absolutely no prior experience with honey bees. Speakers included Dr. Blair Sampson (USDA, Poplarville), Dr. John Guyton (MSU Extension), Dan Triplett (President, Gulf Coast Beekeepers Association) and me.

Dr. Blair Sampson was the featured speaker on Friday evening. He described the basic life history for native bees, with particular emphasis on the Blue Orchard Bee. These bees are important pollinators of blueberries in Mississippi. He told of recent declines in native pollinator species and speculated on the major causes of these declines (loss of habitat, pesticides, etc.).

Blair and Jennifer also led a hands-on activity of drilling holes into wooden blocks that could be hung as nest sites for native bees. They told of how different diameters of holes could be used to stimulate nesting by different species of nesting

bees. Bundles of bamboo sticks were also tied to form simple nesting sites for native bees. The native bee discussion was followed by a film detailing the harmful effects of parasitic mites on the honey bee throughout the world. The night ended with black lighting for insects, which was directed by Dr. John Guyton.

The entire next day was dedicated to learning the basics of beekeeping. I began the day with a brief summary of the value of honey bees as managed pollinators in U.S. agriculture. I was followed by Dan Triplett, who presented the personal protective equipment needed to keep bees. He also assembled a hive from the ground up – describing each component of the hive as it was added to the stack. Dan and I provided a list of key terms used in beekeeping jargon to help the attendees better understand the language of beekeeping. Dan infused some basics of beekeeping management during his presentation.

Dr. John Guyton led a honey tasting exercise in which different varieties were sampled and rated by the attendees. The honeys included gallberry, saw palmetto, tupelo, locust and a few others. The morning session ended with two power point presentations by me. The first presented the basic biology of a colony of honey bees, and the second provided instructions for beginning colonies of bees from packages or nucs or from splitting existing colonies.

The best part of the day was getting outside into some bee hives that were kindly provided by Dan Triplett for the purpose. The weather was stunningly beautiful, and the bees were in a good mood. Many of the novice participants mimicked me and did not wear their veils. Nobody was stung (thankfully)!

Dan patiently instructed participants on how to open a hive, how to progress through the colony to look for the queen or problems, and what to expect in colonies at this time of year. Most participants had never seen the inside of a bee hive before this event, and it is always fun to see the sparkle and joy in the

eyes of newbies when they are that close to bees for the first time. The question and answer session at the hive lasted slightly more than an hour, but if given a chance, we could have spent several hours in the bee yard.



Jeff Harris (green) and Dan Triplett (white shirt behind Jeff) examining colonies of bees with participants of the Grand Bay NEER “Bee Wise” Workshop.

Next, Dan described his activities as a rescuer of honey bees from buildings and other structures. He presented a series of photos for various removal jobs in which his skills as a carpenter were needed to remove the bees from tight places in walls, floors and ceilings and to repair the buildings so that no new swarms of bees could ever be established in the same cavity. He told of how to cut combs from these spaces and to tie them into Langstroth frames so that the colony could be transferred into a standard hive. Dan also showed how a vacuum system could be used to safely remove bees from difficult places. The event ended with a brief description of the honey extraction process by me.

Everyone seemed to have a really good time with the bees. Many participants left with the intention of starting their own hives of honey bees or of building artificial structures to attract native bees to their yards.

## MBA Officers and At-Large Directors 2013

**President** – John R. Tullos (601.782.9234); **Vice President** – Derwin Thrash (601.469.4788); **Secretary/Treasurer** – Stan Yeagley (601.924.2582); **At-Large Director** – Milton Henderson (601.763.6687); **At-Large Director** – Johnny Thompson (601.656.5701); and **At-Large Director** – Steve Coy (coy266588@bellsouth.net)

### Buy, Sell or Service Needed

Heavy duty stainless steel reversible extractor basket for sale. Photos available upon request. Jack Hamblin at (662) 321-3711 or tech1951@bellsouth.net

Queen cells made to order, 14-day advanced notice. \$3.50 each, minimum order of 20. Italian hygenic stock. Pick up in Tylertown, MS, or UPS Next Day air delivery. JYL Apiaries 601-222-1443 or 732-882-6811

4-framed nucs (no frame swap) - \$118.00  
3 pound package - \$85.00  
Queens - \$23.00, shipped - \$25.00  
Nuc with hive equipment – contact for price  
Derwin Thrash at (601) 214-9743 or derwin\_thrash@yahoo.com

Swarms and single-deep hives of bees for sale. James Holley at (662) 256-3590 or [jimholley8@att.net](mailto:jimholley8@att.net)

3 pound packages with a VSH queen, \$95. David Kelton at (256) 523-4767 or [Honeybees60@gmail.com](mailto:Honeybees60@gmail.com)

I make olive oil soap and bar lotion. I am looking for someone in north MS who will sell me bulk beeswax. I have been buying over the internet from DADANT in Illinois but was told that I could buy local in MS and save on shipping. The name of my company is MS SOAPS, and I live in Water Valley MS. Just wondering if anyone sells beeswax. Janet Brewer ([janetbbb29@gmail.com](mailto:janetbbb29@gmail.com))

I'm a hobbyist beekeeper from Maryland. I started a survey to evaluate over winter losses across this country. It's no gimmick or spam. I'm just curious and created a survey to see what data I could find. I don't have a lot of responses from Mississippi, so, if you could pass this URL to anyone in your Honey Bee clubs, I would appreciate it. It's only 9 questions, free and anonymous. I will post results

late this spring on BeeSource.com. John McCabe (thistlecreekhoneycompany@gmail.com)

Survey link:

<http://www.esurveyspro.com/Survey.aspx?id=39bea4dd-a9be-4c82-b249-631e45a8d9b4>

Beekeeping Consulting Classes  
(10 person minimum/ 15 person maximum)

Beginner - \$75.00  
Intermediate I - \$150.00  
Intermediate II - \$150.00  
Advanced - \$250.00

Derwin Thrash at (601) 214-9743 or derwin\_thrash@yahoo.com

### Electronic Newsletter Reaches You Faster

The MBA electronic newsletter is available to members and will get to you faster than regular mail. The quality is also better. Contact Jeff Harris ([jharris@entomology.msstate.edu](mailto:jharris@entomology.msstate.edu)) to submit your e-mail address and request electronic delivery.

Answers to “test your knowledge” in the last issue:

- |      |       |
|------|-------|
| 1. D | 6. B  |
| 2. E | 7. B  |
| 3. A | 8. B  |
| 4. B | 9. D  |
| 5. D | 10. A |

“Bee News & Views” is brought to you by the following:



MSU Department of  
Biochemistry, Molecular  
Biology, Entomology and  
Plant Pathology