Tracking A Serial Killer

Jim Fischer

"The skilled experts who support beekeeping have been victims of a 'Disappearing Disease' of their own. The cause of this disease is clear – no one gave a damn about bees."

Sherlock Holmes was a fictional character, and he only wanted to keep bees when he retired. He never had any cases involving bees.

But we have a mystery here, and Sherlock Holmes would be welcome. Colony Collapse Disorder (CCD) is a killer of hives that leaves taunting clues, but remains unidentified. The shape of stings to come is still uncertain, even after months of hard work.

Few realize that what we now call "CCD" has struck before. In classic serial-killer fashion, it sporadically appeared without warning, turning significant beekeeping operations into little more than abandoned piles of scrap lumber. As early as 1898, "Disappearing Disease" was described with symptoms eerily similar to CCD. It also struck in the 1960s and again in the mid-1970s. Each time, it devastated many hives, caused uproar among beekeepers but eluded identification. Still faceless, it vanished, not to emerge again for decades. Now it's back to kill again. This murderer seems to have vampire-like immortality, outliving all who have tried to put a stake through its heart, sleeping in a coffin no one can find.

A great assemblage of bee research talent gathered at USDA headquarters on April 23rd and 24th, 2007, but three crucial people were missing. First, they had no leader, being provided instead with a meeting facilitator, flustered and bemused at the wandering discussions and the spirited debate over minutiae.

Second, there were no famous detectives in attendance, fictional or real. But most painful of all, with bees dropping like flies, there was no honey bee toxicologist, the last one having retired years ago, but never replaced due to the ever-shrinking budgets allocated to bee science.

The original "CCD Working Group" that met in Stuart, FL in Florida was outnumbered by newcomers to the problem. Some were invited for their expertise. Others because they represented groups that could add value to the discussion, like APHIS (The Animal and Plant Health Inspection Service). Many were likely attracted by the lure of funding from the $75 million requested for CCD in a new Congressional bill.

Perhaps others were attracted by the prospect of media attention, or the sheer thrill of the chase. A dozen or so attended via telephone conference.

The media was also out in force. Science magazine, the New York Times, Cox Newspapers, and Reuters all sent reporters. Initially refused invitations due to the wildly sensational reporting and highly speculative theories about CCD promulgated by most news outlets, they demanded access under the "Government in the Sunshine Act of 1976."

(*Bee Culture* was invited up front without any citing of federal statutes in threatening tones, but we tend to ask more informed questions, being beekeepers ourselves.)

Ironically, after decades of being so completely ignored by the press and general public that researchers had to constantly stress that honey bees are *beneficial* insects rather than scary bugs to be feared and loathed, there was now talk of "media relations," and complaints about "the press" taking up everyone's time.

The focus of discussion was not the bee diseases, pests, or pesticides that could cause CCD, but instead, money. A dizzying array of acronyms for existing federal and state programs that might fund part of the investigation, or who have needed resources and facilities flew about like spitballs in an unruly classroom.

While some money was provided by the National Honey Board and a few groups accepting beekeeper donations, the bulk of that money was spent in the initial field work, on the assumption that the cause of CCD would be simple and obvious.

But the cause appears neither simple nor obvious. The much larger dollar amounts needed to fund a thorough investigation will be some time in coming, even if care is taken to avoid the more tedious approaches to converting "allocated funding" into tangible dollars for actual investigation.

There was one encouraging note. Bayer CropScience offered to provide their standard analytical samples of metabolite chemistry, the chemicals that result from plants metabolizing Imradaclopid. This systemic pesticide, made by Bayer, has been mentioned as a suspect often. Bayer seems confident enough that CCD is not caused by their products to provide the rope that could be used to hang them.

In contrast, the pet food contaminant recently found to be killing dogs and cats was quickly identified by the FDA, and traced back to a raw ingredient. It was then tracked through the entire U.S. pet food business to result in pet food recalls and even criminal search warrants. Clearly, the FDA is much better funded, staffed, and equipped for such forensics than the combined resources of all of "bee science." The resources are already in place at FDA, ready to quickly address such problems, even problems that have no impact on human health or human food at all.

Too bad the same level of resources can't be focused on CCD. It seems that bees don't matter as much as pets do when it comes to funding science to investigate unexplained deaths of useful animals. If bee research needs as much as a single toxicologist, we will have to put an ad in the paper, and beg for money we don't yet have to pay the person we haven't yet hired.

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The punch line here is that bees do have direct impact on human food, while pets don't. Bees pollinate food plants, while pets urinate on them. Why can't we get the FDA to lend a hand with what could be a significant threat to the availability of pollination services, and hence the availability of a wide range of fruits, veggies, and seed stocks? The FDA certainly had time and budget for Fido and Wiskers.

Like Rodney Dangerfield, bees don't get no respect.

The result of the meeting was a wish list of work that would require funding. A delegation was to meet with Senate staffers, and explain the difference between the few capabilities we have, and the many we need.

No attempt was made to narrow down the list of suspected causes of CCD.

The list of suspects grew longer as the meeting progressed, a natural outcome of asking a diverse group of specialists to propose an approach to a problem. As in the parable of the blind men and the elephant, each participant viewed the solution as potentially resulting from a well-funded effort in his or her area of specialty. When you are an expert with a hammer, every problem starts to look like a thumb.

But what are the clues that might eliminate some suspects? Some are harder to ignore than others.

While the marshaled forces of bee science deliberated, fax machines and computers across the country were quietly humming, drafted into a guerrilla movement. A 19-page indictment written by David Hackenberg, the migratory beekeeper to first report serious losses from CCD, claims that systemic pesticides are behind CCD. The key point offered is that corn, soybeans, canola, and cotton are all treated with these pesticides, and that all the large beekeepers who have been hit by CCD had placed their hives on one of these crops to build up their colonies or for a honey crop.

This gentle manifesto sparks outrage among all who read it, as it shows how laws requiring warnings intended to protect bees have been twisted by pesticide ad men into phrases like "You can apply Assail® at any time during the season, even during bloom (when bees are not active)."

Is this advice to fire poison at whim during bloom? It seems to imply the impossible – that bees will somehow not be "active" during bloom!

The misleading wording cynically subverts laws protecting pollinators.

Where are the offices of Cerexagri (makers of Assail, who placed the ads), and where's that rope?

But Hackenberg's calmly written first-hand account seems lost and ignored amongst all the hysterical histrionics of the press and special-interest groups trying to leverage CCD as "proof" that their pre-existing pet peeve is worthy of attention and your donations. "See, the bees are dying, we were right all along!" say the anti-this and anti-that groups. The "Cause of CCD" has become a virus itself, affecting beekeepers, whose minds risk being hijacked by fringe thinking. Victims are infected via e-mail forwarding.

Then there's the experience with comb. Beekeepers who stacked woodenware from dead-outs killed by CCD atop healthy hives to protect the comb from wax moth and small hive beetles saw many of the healthy hives "catch" CCD soon after.

The obvious-to-even-the-casual-observer conclusion here is that CCD is caused by a pathogen that can live on comb even after the bees die.

But researchers hesitate to connect these dots before running tests on comb from CCD-affected hives. No one (as of mid-May) has run these tests yet. No money. Not even enough money to collect a statistically significant number of samples using proper preservation techniques. It's on the wish list.

To confuse matters further, we have the prior outbreaks of CCD. They happened decades ago, before (these new) pesticides, before industrial monoculture agriculture, before genetically-modified crops, before even high-fructose corn syrup. How can anything developed in the past century be blamed?

There is also the simple overt pathology of CCD to consider. Colonies are quickly reduced to at most a queen, a few worker bees, and a large patch of brood. The brood proves that very recently, the hive had enough healthy workers to tend all that brood. The bees were fine, or they would not have been raising so much brood. Something that affects so many bees so quickly just has to be a virus, doesn't it?

And what about the missing house bees? Foragers failing to return from their sorties are expected from pesticide kills, but why are most house bees abandoning brood? The urge to stay with brood is strong - most species will die to protect their young. Something is overpowering even that very basic instinct. These bees seem to be going "insane". Brood is the future of the colony, the only thing bees really live for.

We just don't know yet - we don't have any of the high-tech forensics gear from the TV program "CSI Miami." We don't even have the resources of "Quincy." Decades of "flat" federal funding in inflationary times have reduced the scope of federal research, while draconian budget cutting at the State and University level has eliminated entire programs. Many states don't even have a State Apiarist, let alone bee inspectors. Once-thriving entomology, bee research, and extension efforts have been reduced to lone sages, hoping to stay employed long enough to collect a pension.

The skilled experts who support beekeeping have been victims of a "Disappearing Disease" of their own. The cause of this disease is clear – no one gave a damn about bees, and neglected prudent investment in apicultural science for decades. Thus, beekeeping's "crime lab" capabilities are nothing close to "CSI Miami." They have been reduced to the level of what The Professor could cobble together from coconuts, palm fronds, and bamboo on "Gilligan's Island." We have bright, skilled people, but they lack the proper tools.

And that's why perhaps the largest collection of bee research luminaries to gather into a single room spent all of their time together making to-do lists for use in begging Congress for money.

I hope that by the time you read this, they will have some of that money. So do your bees. BC

Jim Fischer now lives in Manhattan and keeps a few hives on Long Island, but hangs out at the intersection of science and politics, as this is where the truly spectacular train wrecks happen.