Bee experts shred ‘Harvard’ neonics-Colony Collapse Disorder study, upbraid journalists for ‘activist science’

Chensheng Lu was in his element last month, delivering an impassioned speech before a green group at Harvard Law School. The School of Public Health professor was lecturing on his favorite topic–his only subject these days, as it has become his obsession: why he believes bees around the world are in crisis.

[Editor’s note: This report originally appeared in the Huffington Post]

Lu is convinced, unequivocally, that a popular pesticide hailed by many scientists as a less toxic replacement for farm chemicals proven to be far more dangerous to humans and the environment is actually a killer in its own right.

“We demonstrated that neonicotinoids are highly likely to be responsible for triggering Colony Collapse Disorder in bee hives,” claimed Lu. The future of our food system and public health, he said, hangs in the balance.

Lu is the Dr. Doom of bees. According to the nutritionist — but not clear to most other experts in the field — colony collapse disorder (CCD), which first emerged in 2006, can be directly linked to “neonics,” as the now controversial class of pesticides is often called, and also to genetically modified crops. Phased in during the 1990s, neonics are most often used by farmers to control unwanted crop pests. They are coated on seeds, which then produce plants that systemically fight pests.

To many environmental activists, the pesticide does more harm than good, and they’ve found their champion in Chensheng Lu. It’s been a busy fall for the professor, jetting back and forth between Boston and Washington, with forays around the United States to talk to adoring audiences. He presents himself as the defender of bees, and this fiery message has transformed a once obscure academic into a global “green” rock star, feted at events like last month’s lunch talk at Harvard.

The sudden abandoning of hives by honey bees known as Colony Collapse Disorder has emerged as one of the hottest science mysteries in recent years. Lu has authored two extremely controversial papers on CCD: one in 2012 and a second published this past spring. He and his two beekeeper colleagues – there were no entomologists on his tiny research team – contend that neonicotinoids present a mortal threat to bees. Not only that, Lu claims, neonics endanger humans as well, accelerating Parkinson’s Disease.

Lu reached folk hero status among environmentalists last May when the Harvard School of Public Health launched a promotional campaign touting his latest, controversial research: “Study strengthens link between neonicotinoids and collapse of honey bee colonies,” the press release claimed. Before the study was even circulated, stories in some mainstream publications including *Forbes* ran the release with only a pretense of a rewrite.

The story exploded on the Internet. Many environmental and tabloid journalists painted an alarmist picture based on Lu’s research: “New Harvard Study Proves Why The Bees Are All Disappearing,” “Harvard University scientists have proved that two widely used neonicotinoids harm honeybee colonies

," and "Neonicotinoid Insecticide Impairs Winterization Leading to Bee Colony Collapse: Harvard Study" are three of hundreds of blog posts and articles.

Behind the headlines

Although public opinion has coalesced around the belief that the bee death mystery is settled, the vast majority of scientists who study bees for a living disagree–vehemently.

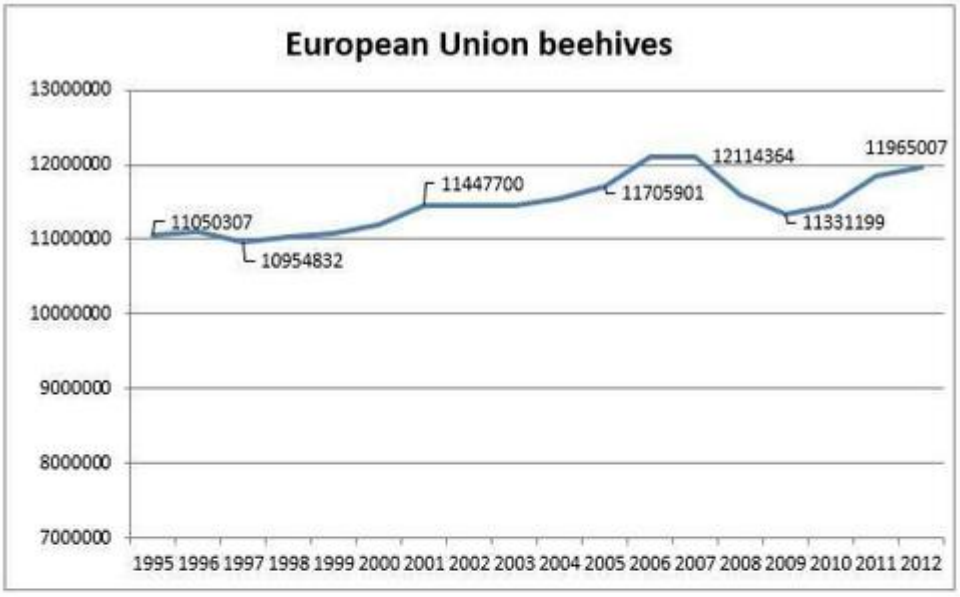
How could a "Harvard study" and a sizable slice of the nation's press get this story so wrong?.

The buzz that followed the publication of Lu's latest study is a classic example of how dicey science can combine with sloppy reporting to create a 'false narrative'–a storyline with a strong bias that is compelling, but wrong. It's how simplistic ideas get rooted in the public consciousness. And it's how ideology-driven science threatens to wreak public policy havoc.

Bees are important to our food supply. They help pollinate roughly one-third of crop species in the US, including many fruits, vegetables, nuts and livestock feed such as alfalfa and clover. That's why the mystery of CCD is so troubling.

One of the central problems with Lu's central conclusion–and much of the reporting–is that despite the colony problems that erupted in 2006, the global bee population has remained remarkably stable since the widespread adoption of neonics in the late 1990s. The United Nations reports that the number of hives has actually risen over the past 15 years, to more than 80 million colonies, a record, as neonics usage has soared.

Country by country statistics are even more revealing. Beehives are up over the past two decades in Europe, where advocacy campaigns against neonics prompted the EU to impose a two-year moratorium beginning this year on the use of three neonics.

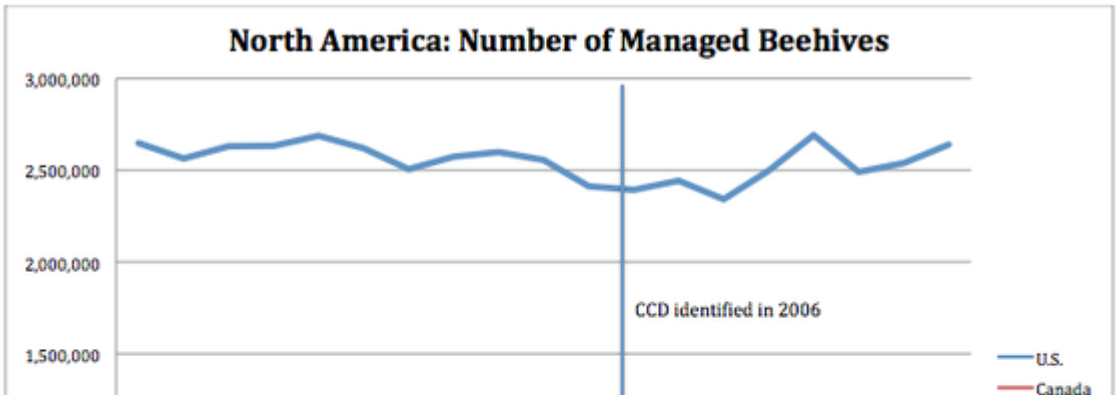


Year	Beehives
1995	11,050,307
1996	11,111,200
1997	10,954,832
1998	11,038,614
1999	11,074,627
2000	11,188,657
2001	11,447,700
2002	11,460,074
2003	11,454,954

Year	Beehives
2004	11,537,202
2005	11,705,901
2006	12,104,149
2007	12,114,364
2008	11,597,026
2009	11,331,199
2010	11,457,687
2011	11,851,378
2012	11,965,007

FAOSTAT

Last February, the government of Australia, where neonics are used extensively, reaffirmed that "honeybee populations are not in decline despite the increased use of [neonicotinoids] in agriculture and horticulture since the mid-1990s." Its central finding was just the opposite of what many in the media have reported: The APVMA (Australian equivalent of the EPA) concluded, "[T]he introduction of the neonicotinoids has led to an overall reduction in the risks to the agricultural environment from the



in 1995 to 672,000 in
r the last two decades.

Sources: USDA and Statistics Canada

So how did the narrative that the world faces a beepocalypse become settled wisdom? The media have widely conflated two parallel but different phenomena: Bee deaths related to CCD and bees dying from other causes.

Bee health took a sharp hit in the 1980s and has been struggling during the winter months for decades coinciding with the global spread of the parasitical Varroa destructor mite and the sub-lethal effects of miticides used to control the parasite. But these overwinter losses, while troubling, haven't translated into declines in the overall bee population because bees reproduce rapidly in warmer months.

The bee health issue erupted into the public consciousness in 2006, when bee die-offs mysteriously spiked–in California to as high as 80%.

GMOs and cell Phones did it?

The event was dubbed CCD by a team of entomologists because of the unique characteristics of the deaths: the unusual abandonment of hives by the oldest bees leaving behind larvae, the queen and food stores.

Advocacy groups originally pointed to cell phones and genetically modified crops as the likely culprits, and some fringe organizations, like the fringe activist group the Organic Consumers Association, still do. But CCD gradually subsided.

Dennis van Engelsdorp, a University of Maryland entomologist who was part of the research team that named CCD, has written to me that there has not been a single field CCD incident in the last three years, except cases linked to the Nosema fungus. Confusing the picture, overwinter bee deaths also increased in the years after the CCD scare, reaching 30% or more in the US and in some European countries. Confounding doomsayers, losses plummeted to 21.9% over the winter of 2011-2012, jumped again during the following year's frigid weather, then settled back into the low 20s.

In some states, like North Dakota, which is the largest honey producer in the US, the number of bee colonies has hit an all-time high.

The recent trend in Europe is also encouraging. In April, the EU released a report called Epilobee that surveyed bee health in 2012-2013. Seventy-five percent of bees suffered overwinter losses of 15% or less, a level considered well within the acceptable range in the US. Only countries in Europe's far north, home to 5% of the bee population, and which suffered through a bitter winter, experienced losses of more than 20%.

In short, most entomologists scoff at media references to a beemageddon.

But that's exactly what Lu claims.

Hyping the "Harvard" studies

Mother Jones, in its coverage led by food reporter Tom Philpott, has been particularly myopic in its promotion of Lu's controversial views and the scientifically dubious claim that neonics is the prime driver of bee deaths. It's run more than a dozen articles about the alleged mortal threat posed by neonics. Upon the release of Lu's most recent study, Philpott titled his article, "Did Scientists Just Solve the Bee Collapse Mystery?"

There were no "scientists" behind the Lu study, of course–only Lu himself. But rather than seeking out views of established experts in the field, he had Lu and only Lu answer the question he posed.

"[C]oming on the heels of a similar [study] he published in 2012, the CCD mystery has been solved," he wrote. Philpott now unqualifiedly, and incorrectly say mainstream entomologists, refers to neonics as "bee killer chemicals."

Who is Chensheng (Alex) Lu, the Dr. Doom of honey bees? He is an environmental researcher with the Harvard School of Public Health with no formal training in entomology. His two bee papers are "Harvard studies" only in the sense that the only scientist who conducted the studies has a Harvard faculty appointment; his co-authors are local beekeepers. Both studies appeared in one of the most obscure science journals in the world, a marginal Italian journal.

Lu emerged out of academic obscurity two years ago with the publication of his first study on bee deaths. He promoted a simple explanation, the kind that energizes activists: A new class of pesticides, promoted by large chemical companies as a safer alternative to older chemicals, was a hidden killer.

"I kind of ask myself," Lu told *Wired* in 2012. "Is this the repeat of Silent Spring? What else do we need to prove that it's the pesticides causing Colony Collapse Disorder?"

The second coming of Silent Spring? Almost from the day his first study was published, Lu was making grandiose claims. By his own admission, he is the definition of an activist scientist. He is on the board of The Organic Center, an arm of the multi-million dollar Organic Trade Association, a lobby group with strong financial interest in disparaging conventional agriculture, synthetic pesticides and neonics in particular–a conflict of interest that Lu never acknowledges and to my knowledge no other journalist has reported.

Earlier this month, OTA announced it is partnering with Lu to tout the benefits of organics, including promoting the dangers of neonics.

Many of the world's top scientists have challenged his research. Dennis vanEngelsdorp called Lu's first study "an embarrassment" while Scott Black, executive director of the bee-hugging Xerces Society for Invertebrate Conservation, characterized it as fatally flawed, both in its design and conclusions.

University of Illinois entomologist May Berenbaum, who chaired the National Academy of Sciences 2007 National Research council study on the Status of Pollinators in North America called it "effectively

worthless” to serious researchers. “The experimental design and statistical analysis are just not reliable,” she said.

Beekeepers have been skeptical as well. Lu’s findings contradicted what they witnessed in the fields. If neonics were a mystery killer, then not using them should translate into healthier bee stocks; but that’s not what has happened.

“In places where neonicotinoid pesticides have been banned, such as France and Italy, there’s no evidence that honeybee populations have rebounded,” noted Hannah Nordhaus, beekeeper and author of the bestseller *The Beekeepers’ Lament*.

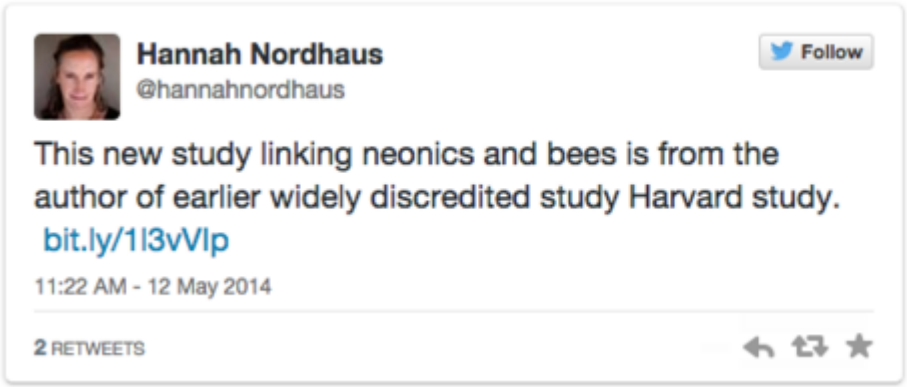
Lu has been defiant since the stinging expert rejection of his first paper. He sees the fingerprints of a Big Ag conspiracy of chemical companies, USDA and entomologists who he believes are ignoring the dangers to bees. Those are damning charges if true, but Lu had yet to present any evidence to back them up–until the publication of his newest paper last May.

Lu monitored 18 hives, a small number for such a complex study, comparing two different pesticides in different locations. He fed bees high fructose corn syrup laced with two neonics, imidacloprid and clothianidin, for 13 weeks. It was an odd choice because bees in fields usually only feed for as few as two weeks. Six of the 12 colonies fed neonics eventually ended up showing substantial deaths over the winter, as did one of the six control colonies.

According to Lu and his beekeeper co-authors, this proved that neonics cause CCD.

To seasoned observers of the bee controversy, the “new” study looked like more of the same. “Lu’s sample sizes are astonishingly small,” May Berenbaum told me, ticking off a litany of problems. “He never tested for the presence of pathogens, so his conclusions dismissing other likely causes don’t follow from his data. The whole study just doesn’t hold together. And I’m not being a fusspot here. It’s unfortunate this was presented as a Harvard paper because it gives this credibility that it doesn’t deserve.”

Twitter lit up with critical comments, starting with Nordhaus:



Many other critical posts followed, including by Brian Ames, a prominent apple grower, artisanal honeymaker and beekeeper:

Even rudimentary digging by reporters would have turned up the revealing fact, unreported by the adulatory environmental press, that first study was rejected by Nature, as Lu himself has acknowledged, before ending up in the *Bulletin of Insectology*, a marginal "pay for play" publication that is known to publish research often rejected by mainstream peer-reviewed journals.

(The *Bulletin of Insectology* has an "impact factor" (IF) of 0.375, which means that the average paper from that journal is cited by another journal approximately once every three years; in contrast, *Nature*, which rejected Lu's first paper, has an IF of 51).

The second study faced the same fate. Unable to get his work published by credible journals, Lu returned to the same publication that put out his first piece–perhaps the only journal in the world that would publish it.

"Anyone at this point in time who wishes to make a contribution to the study of potential effects of neonicotinoids on honey bees–or any other aspect of honey bee health–and publishes this data in the extremely obscure journal Bulletin of Insectology is very hard to take seriously," Colorado State University entomologist Whitney Cranshaw emailed me.

A week does not go by without one advocacy group or government official or activist scientist making sensational claims about the supposed catastrophic dangers that neonics supposedly present.

In November, for example, advertisements began appearing across Ontario in Canada warning, “neonic pesticides hurt our bees and us,” one of them accompanied by a young boy gazing sadly at a dead bee.

They were placed by a fringe advocacy group, the Canadian Association of Physicians for the Environment; its primary funder is David Suzuki, a once prominent but now long retired geneticist who more recently has become known for rants against GMO foods.

That kind of hyperbole, scientists say, obscures the complex story of what’s really happening to bees and why–and the risks of advocacy groups and activist journalists driving science and agricultural regulations into a policy ditch.

Which brings us back to the curious case of Alex Lu.

Although Lu’s most recent paper, published last spring, was not clear on this point, the nutritionist has publicly maintained that neonic seed treatments are the driving cause of CCD. Let’s be clear. Neonics are an appropriate subject for serious research. They are neurotoxic pesticides. Because they rely on a

complex set of behaviors, bees exposed to high volumes could conceivably become drunk and ill. Scientists are and should continue to examine this chemical and all agricultural chemicals.

But the emphasis of many popular articles, and Lu's study, is way out of whack with the potential dangers that scientists believe are presented by neonics. The pesticide is applied to seeds sparingly — only about 1-3 ppb is commonly found in pollen or nectar after application, levels way below safety concerns. Plants grown from a treated seed often need no further insecticidal treatment, unlike many competing chemicals. And in contrast to earlier generation insecticides that required multiple applications, when infestations are severe a single additional spraying generally suffices.

Lu steadfastly claims that bees that died in his studies were fed field realistic levels doses–statements echoed uncritically by reporters without, it turns out, cross checking with beekeepers or entomologists. "Chensheng Lu and his team treated 12 colonies with tiny levels of neonics," Mother Jones maintained.

Tiny?

As Randy Oliver, a well known beekeeper, wrote on his Scientific Beekeeping blog, Lu fed his test colonies a pesticide brew of about 135 parts per billion (ppb). That's 100 times higher then the 1-3 ppb commonly found in pollen or nectar, a level far below safety concerns. Rather than citing the chemicals' ppb, some reporters touted the physical size of the dose, a worthless measurement. Lu also fed bees every week for 13 straight weeks when the real world application is just a few weeks at most.

"It's hard to imagine anyone even reviewed this paper," Oliver concluded.

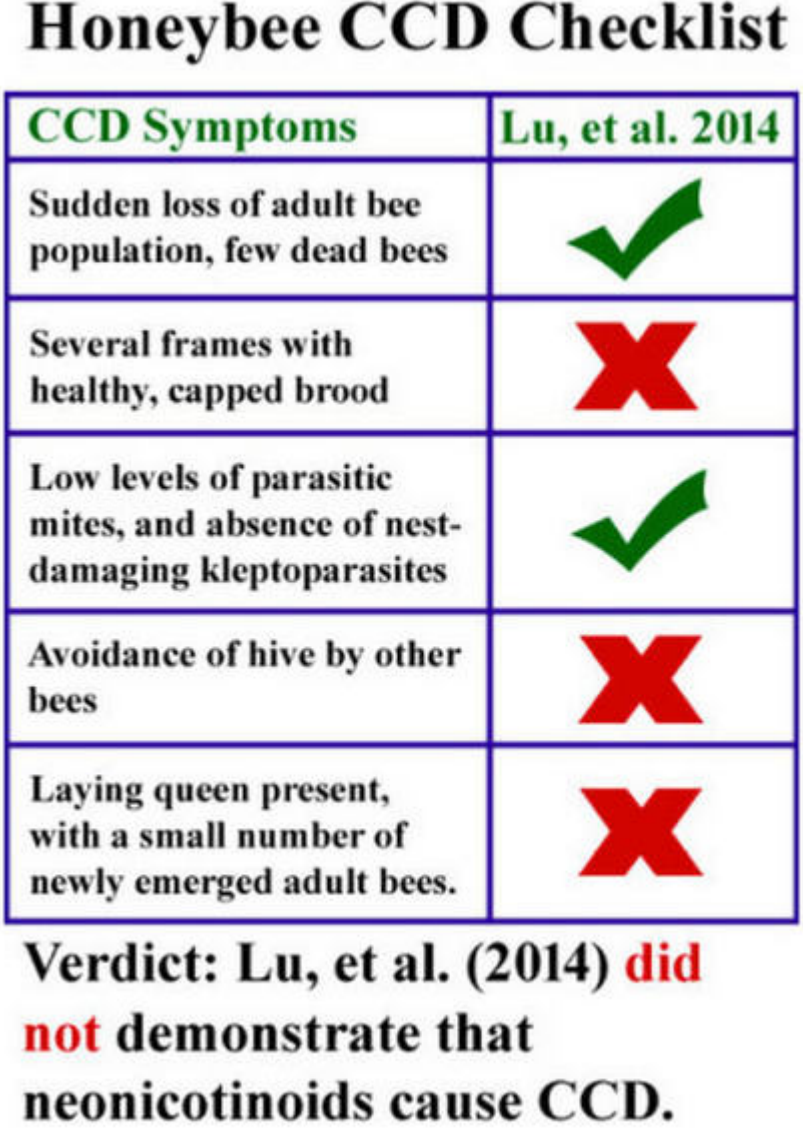
What's remarkable, numerous scientists and beekeepers told me, is that Lu's bees didn't just keel over in the first few weeks after sucking down what amounted to a lethal cocktail every day.

"It's surprising those colonies lasted so long given the stratospheric quantities of insecticide [Lu] pumped into them for 13 weeks," wrote Jonathan Getty on Bee-L Chat, a discussion forum for bee experts. "Lu has convincingly demonstrated, again, as in his previous study … that a high dose of an insecticide will kill an insect. Has anyone learned anything from all this? Looks like junk science at its worst."

There was also scant evidence to back up Lu's central claim that he had solved the mystery of CCD. "His description of the hives just didn't show that," University of Maryland entomologist Dennis vanEngelsdorp told me. Bee die offs, he said, have occurred mysteriously and periodically since at least the mid-19th century but became the focus of widespread public concern only in 2006. It's clear that what Lu observed–bee deaths–"was not CCD. Looks like a typical bee colony death over the winter–which often includes bees abandoning the hive–but it's a slow dwindle not a sudden collapse."

Joe Ballenger, an entomologist writing for the independent sustainability site Biology Fortified, outlined how little Lu appears to know about CCD. "There are very important differences between the colonies Lu poisoned with insecticide and those which have been affected by CCD," Ballenger wrote. "Despite these differences, Lu claims he has replicated CCD. However, his data demonstrates that he did not replicate CCD."

Ballenger drew up a chart of Lu's mistakes:



Are there any prominent entomologists who endorse Lu's findings? I couldn't find any. Mother Jones quoted Jeffrey Pettis, an entomologist and research leader at USDA's Beltsville's Bee Laboratory, as appearing to be supportive. "Pettis told me that he thought Lu's study 'adds to the list' of studies showing that pesticides pose a significant threat to honeybees," Tom Philpott wrote.

I emailed Pettis about that quote:

> I was trying to be diplomatic when I talked to Philpott but the Lu study should not have been published. It is not good science. I was trying to say that it adds to the list that pesticides and bees don't mix but it is not a paper that shows that neonics cause problems simply because it was poorly replicated with high dosages used.

So what was going on in the hives that Lu monitored? The bee deaths that Lu found suggest a quite different cause, said vanEngelsdorp; the bees appear to have been killed by Lu himself–entirely expected if hives are overdosed during a frigid winter.

Are there potential advantages to using neonics to control pest infestations?

A telling fact emerges when you view the landscape of studies on neonics: on the whole, those done in a laboratory or that use unrealistic high doses (e.g. Lu's studies) raise precautionary concerns. In contrast, field observations show few if any serious problems.

The latest example? Four Canadian scientists led by Cynthia D. Scott Dupree, an environmental biologist at the University of Guelph, undertook a large-scale study of honey bee exposure to one neonic, clothianidin, which is applied as a seed treatment. The study was centered in southern Ontario, which advocacy groups have contended has been particularly hard hit by neonic-related bee deaths.

Designed in cooperation with the U.S. Environmental Protection Agency and Health Canada, it was industry funded, but executed under Good Laboratory Practice Standards.

The scientists observed bees foraging heavily on the canola. As numerous other studies have suggested, they found, "Although various laboratory studies have reported sublethal effects in individual honey bees exposed to low doses of neonicotinoid insecticides, the results of the present study suggest that foraging on clothianidin seed-treated crops, under realistic conditions, poses low risk to honey bee colonies."

Assertions by entomologists that neonics play a limited role in bee health infuriates some environmentalists convinced this mystery is solved: Let's just ban neonics, they say, and move on.

"For its part, the pesticide industry is doing its best to shroud the phenomenon in uncertainty," *Mother Jones* wrote in its article hyping the Lu study, "promoting a 'multifactorial' explanation that points the finger at mites, viruses, and 'many other factors, but not…the use of insecticides,' as neonic producer Bayer puts it in its 'Honey Bee Health' pamphlet."

But it's not Bayer making those claims, as Philpott seemed to suggest; it's independent and government scientists. Noting the complexity of the phenomenon, the US Department of Agriculture and the Environmental Protection Agency took a cautious, science-based approach to the emerging controversy three years ago, commissioning a broad-based assessment of the evidence. This panel, reflecting views by most beekeepers and academic experts, concluded that neonics were unlikely to be the major driver of bee deaths.

Rather, the experts identified a complex set of causes likely linked to a surge in pathogens, such as Varroa mites that feed on the bodily fluids of bees and which first surfaced in the U.S. in the 1980s and began infesting beehives in California in 1993; and Nosema, a common parasite that invades their intestinal tracts; and the use and perhaps misuse of miticides to control them. Other issues include the stress put on bees by large commercial beekeepers, particularly to service the agri-business demand for bees needed for the California almond crop in late winter before bees normally repopulate, as well as

climate change and breeding issues.

Few experts or practitioners believe banning neonics or GMOs would improve bee health and could in fact result in farmers going back to spraying insecticides known to harm pollinators and humans.

“If we took pesticides out of the equation tomorrow, I think there’s no doubt we would have reduced colony losses,” vanEngelsdorp told me. “But even without pesticides, we’d still be seeing significant losses–losses that are unsustainable.”

Neonics present in corn dust at planting have been shown definitively to contribute to bee mortality, but that’s a result of faulty formulation, scientists have concluded. When used properly, there is intriguing evidence that neonics may actually improved bee health in some circumstances. Hints can be found, ironically, in Alex Lu’s own data, of all places.

Lu’s 2012 paper raises red flags because he used two separate dosing regimens as the experiment progressed, noted Richard Cowles, a prominent entomologist with the state of Connecticut, in an email to me. During the first four weeks of his study, the bees were fed concentrations of imidacloprid that, as it turns out, were in fact field realistic. At three weeks into testing using these concentrations, the health of the bee colonies was positively correlated with exposure to imidacloprid, as measured by the number of capped brood cells. In other words, the bees appeared healthier.

“Rather than continue the experiment with these concentrations, Dr. Lu inexplicably increased the dosages for the last nine weeks of feeding-by 40 times,” Cowles told me.

Why?

Cowles couldn’t get an answer from Lu and neither could I. This is one of the many questions that I had hoped to put to Lu in an interview. He at first agreed by email but then stopped communicating. I contacted him again and also reached out to the Harvard School of Public Health, but got no reply. Entomologists have volunteered as to what they thought might have been going on when Lu changed feeding tactics.

“Dr. Lu probably was trying to hide the fact that he observed an unexpected result contrary to his expectations, which led to him increase the dosages to poison the bees,” Cowles, emailed me. “Whether this sub-lethal effect is actually therapeutic to honey bees is a very interesting question, and one that I’d like to investigate.”

In other words, Lu’s data suggests the opposite of his stated conclusion–bees appear to do fine when exposed to field realistic doses and even increasingly higher amounts of neonics, but ultimately succumb to astronomical levels.

This is not the first time a neonic study has shown that bee health might improve when crops are treated with new generation insecticides. In a 2013 PLOS ONE study, a team led by vanEngelsdorp and Jeffrey Pettis studied the real world impact of 35 pesticides including three neonics–acetamiprid, imidacloprid and thiacloprid–by examining hives from seven major crops. Intriguingly, bee health improved although the

results would need to be confirmed with follow up research. This study remains the only lab research to date that has evaluated how real world pollen-pesticide blends affect honey bee health.

The researchers found a striking reduction in the risk from Nosema infection when neonics were used, bee health improved. Why would that be? It seems neonics may suppress the parasite associated with the disease. vanEngelsdorp and Pettis are not yet sure this is a real effect; good science requires that results be confirmed in multiple studies. That said, the intriguing but startling finding directly challenges the belief that neonics pose an unusually unique danger to bees.

What is the future for bees, neonics and agriculture?

Are there replacement insecticides if neonics should be banned? Sure. Those based on pyrethroids and organophosphates some of which are more toxic to bees and humans, are not as effective as neonics for many uses–and are not in the political crosshairs.

That's not slowed demands for an immediate ban. Advocacy groups recently widened the scope of their concerns, claiming neonics could have an unknown environmental impact, and waterways are being polluted. But evidence for that is scant. A US Geological Society study published in July found the highest levels detected were at least 40 times lower than benchmarks established by EPA to be protective of aquatic life, and most were up to 1,000 times below that level.

What would happen if U.S. officials do institute sharp restrictions, as the White House may be contemplating?

Neonics are not only important to major row crops such as corn, soy and canola, they also remain the most effective weapon against Asian psyllid, an insect that spreads the deadly virus that threatens America's citrus crop. They are the key pesticide keeping in check whitefly infestations, which could otherwise devastate winter vegetables. They are the primary insecticide used to counter leafhoppers in the grape-growing Northwest as well as thrips in cotton and water weevil in rice. They've been hugely successful in combating aphids and beetles in potatoes.

I found scant support among entomologists for the two-year precautionary moratorium adopted by European politicians in the wake of near hysterical media reports in 2012 and 2013, many generated by coverage of Lu's research. That ban looks like a textbook case of "shooting before you aim," resulting in unintended but predictable consequences. As Matt Ridley reported in November in *The Times* of London:

> All across southeast Britain this autumn, crops of oilseed rape are dying because of infestation by flea beetles. The direct cause of the problem is the two-year ban on pesticides called neonicotinoids brought in by the EU over British objections at the tail end of last year. … Farmers in Germany, the EU's largest producer of rape, are also reporting widespread damage. Since rape is one of the main flower crops, providing huge amounts of pollen and nectar for bees, this will hurt wild bee numbers as well as farmers' livelihoods.

There are now growing concerns that Lu's studies will carry weight with politicians facing pressure to "do

something". That's what happened in late November in Ontario, where the government has proposed to restrict the sale of corn and soybean seeds treated with neonics to farmers by 80 percent over the next two years.

The very same week, Health Canada issued a report after a long investigation that found bee mortality, which was not an issue until 2012, dropped 70 percent over last winter.

Activists are trying to jack up political pressure in the United States, perhaps concerned as signs that a temporary global surge in bee deaths appears over, undercutting their campaign. In September, a coalition of environmental groups co-wrote a letter signed by 60 Congressional Democrats urging the EPA to restrict neonicotinoid use citing Lu's work in arguing that "native pollinators" have "suffered alarming declines."

Those calls send chills down the back of entomologists concerned that Lu's claims that he has solved the mystery of the beemageddon that doesn't actually exist will have a bullying impact on public policy.

"Lu's work is clearly biased, sensational," said Richard Cowles. "It is horrendously incompetent. This is just hogwash. We will all pay a price for bad research."

May Berenbaum was appointed this past summer to chair a National Academy of Sciences study on the health of pollinators ordered by the White House. I asked her if there is anything of value in Lu's study to guide scientists and regulators? Do neonicotinoids threaten the health of this beleaguered arthropod?

Berenbaum paused. A dedicated environmentalist, she is known for her understated fairness.

"I'm no fan of pesticides and they are overused in agriculture, but you won't find any confirmation of that in this study."

Science is not a set of results; it is a method. If the method is wrong, the results are useless. The uncomfortably high number of bee deaths eludes the kind of definitive but potentially reckless conclusion that could result in precipitous regulations.

"This is a really complex issue with no quick and easy solutions," Berenbaum said. "I can't imagine a situation in which I would cite the findings of this paper as rigorous and reliable. This is just not good science."

Jon Entine, executive director of the Genetic Literacy Project, is a Senior Fellow at the World Food Center Institute for Food and Agricultural Literacy, University of California-Davis and at the Center for Health and Risk Communication, George Mason University. Follow @JonEntine on Twitter.