GENETIC LITERACY PROJECT
SCIENCE TRUMPS IDEOLOGY

Beemageddon? As hysteria over endangered honey bees recedes, anti-neonic narrative refocuses on wild bees

Jon Entine | July 16, 2015 | Genetic Literacy Project

Like the fictional parents in the edgy comedy show *South Park*who blame Canada for all of their woes, environmentals often coalesce around an issue and then come up with a simple but sometimes simplistic narrative to anchor their advocacy.

We've seen that with fracking, which is often blamed for massive groundwater pollution (the EPA has rejected that claim) and greenhouse gas threatening methane gas releases (rejected as a serious problem by numerous independent researchers). The decades long decline in the global frog population is often blamed on atrazine, although the decline is mostly occurring where atrazine is not used, and recent study by the leading anti-atrazine crusader has now found that exposure to atrazine made zero difference in frog health.

Let's call it the environmental crisis narrative. Empirical evidence rarely stops memes from flooding the Internet, filling up environmental blogs and showing up in letters appealing for donations to support causes built around an impending ecological reckoning. Scare stories work.

This is certainly true in the debate over GMOs, and the emerging poster children for their alleged dangers: birds and bees, pollinators who will supposedly face devastation if the crop biotechnology revolution continues unabated.

In the GMO debate, the focus for years had been on safety concerns. GMOs cause allergies, autism, cancer… almost every major disease has been cited on one site or another. Those claims have been put to rest by hundreds of independent studies. One global science group after another has came out with statements that GM foods are as safe or safer than organic and conventional foods. The science eventually won the minds of the mainstream media, including the New York Times, Washington Post, Boston Globe, Scientific American and most recently USA Today and Slate, all of which reaffirm the safety of GMOs criticize anti-GMO campaigners for deliberate manipulation of the science and reject singling out GM foods for labeling. The 'GMOs are dangerous' meme door is now closed.

Credit activists for ingenuity. Indefatigable in their opposition to crop biotechnology, they've recently shifted their anti-GMO focus to the back box of 'dangerous' chemicals, which they claim are inextricably tied to GMOs and modern agriculture, and are the real problem. To help emotionalize their campaign, they've come up with an iconic symbol to encapsulate their outrage: the honeybee.

Are honeybees threatened?

It's been estimated that for five years, until 2013, some 30 percent of honeybees in the United States either disappeared or failed to survive winters to pollinate blossoms in the spring. That was about 50% more than the rate expected.

What caused the die-offs and why were bees dying in higher numbers in California and parts of Europe but thriving in other countries in Europe, Western Canada and Australia?

Many advocacy environmental groups and some journalists initially blamed GMOs for bee deaths, and some still make that claim, although there is zero evidence to back it up. When that didn't get traction, their ire switched to a class of pesticides known popularly as neonics.

"It's time to ban dangerous neonicotinoid pesticides," read a headline in Mother Earth News. Highly charged words like "beepocalypse" or "beemageddon" began turning up everywhere on the Internet. As measured a reporter as NPR's Dan Charles characterized bee health in 2013 as "a crisis point for crops."

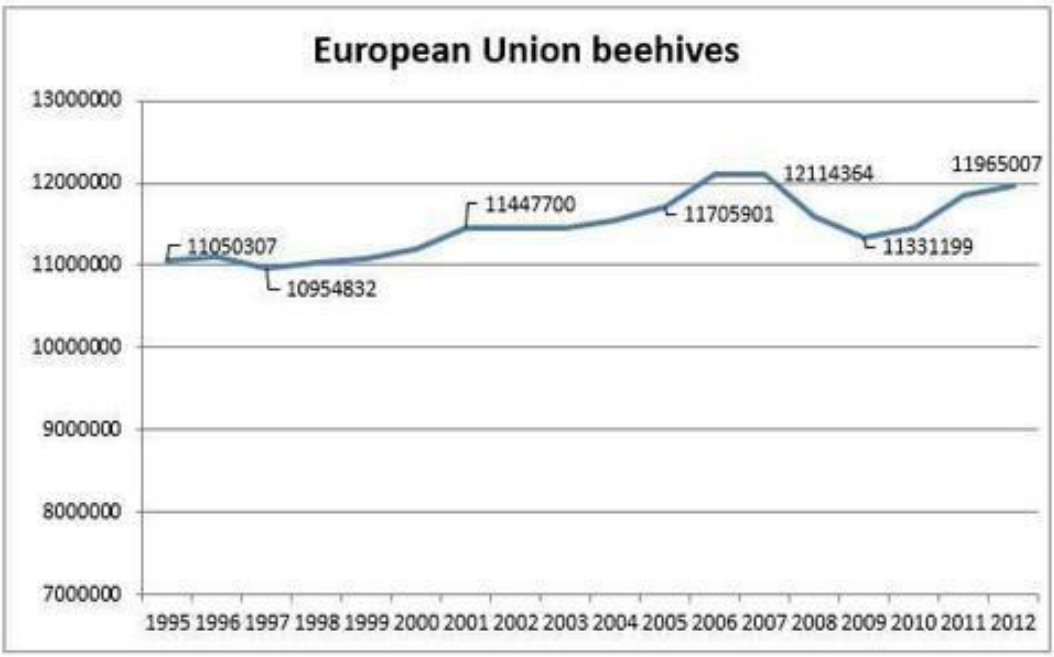
Those claims proved alarmist. Over the past two winters, the perceived crisis has sharply receded as bee survival rates have improved dramatically, particularly in North America and Europe. But the initial hyperbolic reports had hardened into a mainstream media meme; no amount of field evidence was able to change the arc of scare based reporting to focus on the actual evidence. With the media die cast and op-eds appearing weekly demanding action, regulators–besieged by activist protests–acquiesced to public pressure to 'do something,' whether based on the latest science or not.

Even their sharpest critics among NGOs acknowledge that neonics are extremely effective. Often applied only to the soil or used as a seed treatment, they were introduced in the mid-1990s without incident as a less toxic replacement for the mass spraying of organophosphate and pyrethroid pesticides, which are both known to kill bees and wildlife. Organophosphates in particular have been linked to health problems in farm workers. Despite their comparatively benign toxicological profile, however, neonics have emerged as Public Enemy Number 1 in the eyes of anti-pesticide campaigners.

This belief is problematic to farmers and not at all helpful to bees. In 2013, panicked European Commissioners passed a two-year ban on neonics after sketchy reports of higher-than-normal winter deaths. Now the unintended consequences of what seems like a hasty decision are emerging.

The commission's moratorium vote came despite contradictory field evidence–and well before the release of a spate of new studies suggesting that bee health had been improving globally even while neonics have been in use.

According to the latest report from the Food and Agricultural Organization of the United Nations, world-wide bee populations have been steadily increasing over the past decade and have hit a record high–considerably higher than when neonics first came on the market in the mid 1990s. Both Europe and the US are at or near all time highs.



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

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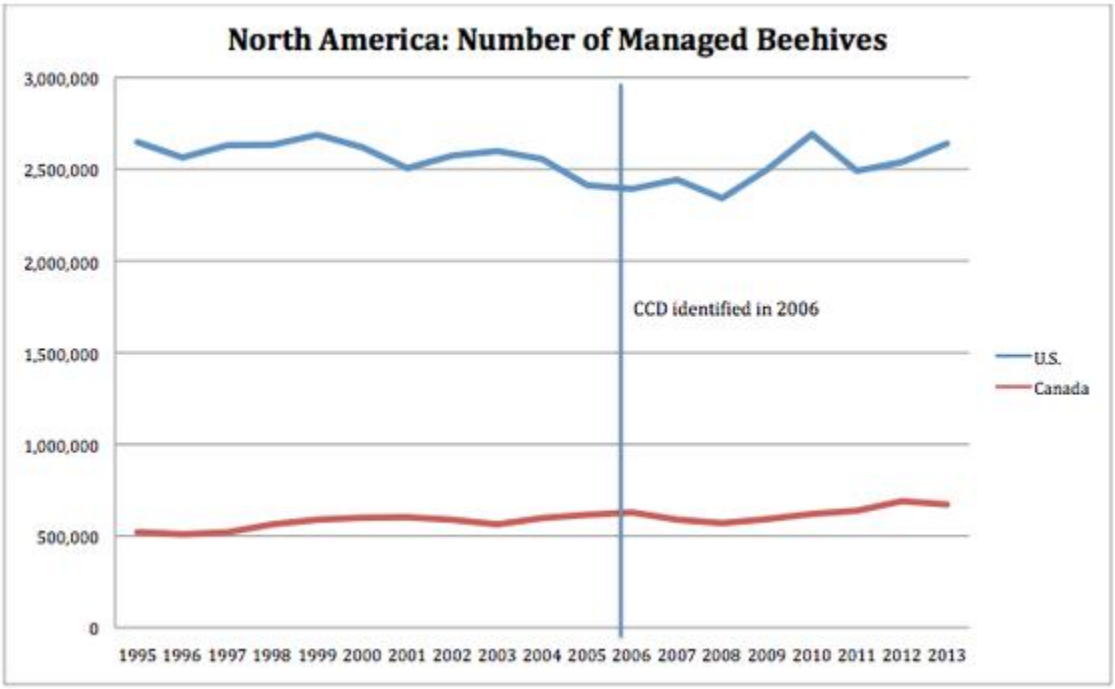

Sources: USDA and Statistics Canada

The US Department of Agriculture reported bee deaths have dropped nearly 25% over the past two winters and the overall population has increased 17% since 2008. Beehives regenerate quickly in the summer, so normal winter losses don't necessarily translate into declining populations, which is why initial reports should not be taken at face value, as many reporters do. Overwinter losses in the US are now just a few points above the 18.9% average losses considered acceptable by beekeepers, according to USDA's Bee Informed Partnership, which runs the annual survey.

Meanwhile, Colony Collapse Disorder (CCD), a fearful term that invariably finds its way into advocacy scare-o-grams and sympathetic media accounts, has come and gone as a major threat. Dennis van Englesdorp, the University of Maryland Researcher who coined the term, said last year that he had not seen a true case of CCD–a unique phenomenon involving bees abandoning their hives–in more than three years.

The Department of Agriculture announced in March that honey production, which had been disrupted after CCD devastated the bee population nine years ago, continues to improve, up 14 percent. The total number of hives also increased again, by 100,000 or 4 percent, as it had increased the year before and the year before that.

The EU annually catalogues bee health. The recently released Epilobee Survey covering the winter 2013-2014, found overwinter bee losses dramatically down and well within normal ranges, below 15.4%. Considering the improving health of bees, farmers who have been hit hard by the neonics ban are pressing the EU to lift the moratorium. A working paper by the UK's

Humboldt Forum for Food and Agriculture had estimated the EU ban could cost Europe €17 billion over five years if farmers are forced to continue to use to less efficient chemicals and land-use practices. To control pests, European farmers faced with the neonics ban have been forced to turn to more toxic chemicals: organophosphates and pyrethroids, known pollinator destructors that also pose human health hazards.

Field research shows no bee crisis while lab tests over dose bees

The surveys reinforce the latest field research findings: neonics are not a driving cause of bee deaths. Sure, if you feed bees catastrophically high doses of neonics you can kill them–Harvard's Chensheng Lu's controversial studies published in fringe pay-for-play journals showed that. Lu's research has been savaged by the mainstream science community.

A 2014 report in the journal Environmental Toxicology and Chemistry (ETC) reviewed bee health over multiple years and reached a similar conclusion: "The epidemiological evidence from Europe shows no correlation of honeybee losses to pesticide use and indicates the presence of causal factors other than pesticides."

That ETC also noted the disjunction between controlled experiments in labs and reports from farms. When force-fed or injected with neonics, bees have shown disturbing effects. But most entomologists are cautious about the meaningfulness of such research. In contrast, studies monitoring bees in fields have shown little or no adverse effects where neonics are used. Lab studies that make research so attractive to scientists looking for quick answers often make it impossible to account for the complex activity in hives, which many scientists believe self-regulate, naturally clearing toxins. Neonics, ETC researchers concluded, "do not cause acute toxic effects on foraging honey bees or significant health effects to colonies."

A string of recent studies looking at the relationship of pesticides found in pollen to honey bee colony health to neonics underscored the questionable laboratory research.
Independent researchers funded by the USDA, publishing in March in PLOS ONE, politely slammed many past studies that hyped pesticides, neonics in particular, as the likely driving cause of declining bee health.

Sébastien Kessler's lab in Newcastle in the UK confirmed findings in other field studies that bees suffer no observable negative effect even at field relevant doses well more than ten times the concentration one would expect in pollen and nectar. This is consistent with the findings of a four year monitoring study published in 2013 that found no effect on bee mortality, foraging behaviors, colony development and overwintering success following exposure to neonic treated oilseed rape.

Even European scientists whose controlled lab studies prompted the European ban are backtracking from past alarmist claims. According to Mickaël Henry, a researcher at France's

government-funded agricultural research institute, “The dose we have used might overestimate the dose on the field.” In fact, he said, “We have no real clues of what proper, realistic dose you should use in such an experiment.”

Henry’s study had found that honeybees exposed to neonics were less able to navigate back to their colonies. But just this spring, non-industry Swedish researchers looking at the impact of the chemicals in realistic agricultural settings, concluded neonics have no impact on honeybees.

A joint report by the Agriculture Department and the EPA issued two years ago concluded that pesticides while a minor contributor were way down the list of likely causes. They cited as the primary drivers: colony management, viruses, bacteria, poor nutrition, genetics and habitat loss. By far the biggest culprit–the report called it “the single most detrimental pest of honeybees”–was identified as the parasitic mite varroa destructor–which along with Nosema parasite are considered the leading threats to bee health.

As it’s become increasingly clear that pathogens are the driving problem for honey bees, not neonics, ban advocates have tried to hype the synergy theory: that pesticides. neonicotinoids in particular, work nefariously in tandem with pathogens and parasites–there is a synergistic effect–to weaken bees. But the latest science doesn’t agree.

“We show that pesticide exposure and pathogen infection have not yet been found to interact to affect worker survival under field-realistic scenarios,” concluded researchers in a study published earlier in July. The synergistic theory, which is attractive to activists in part because it is almost impossible to evaluated, has been fueled by lab studies that overdose bees while field studies do not show an effect. That’s exactly what has been the case in prior poorly constructed but well publicized lab studies, notably Lu’s work, which turned bees into helpless neonic drunks.

What about wild bees? The great activist pivot

For over four years now, environmental activists have been claiming that we are in the midst of a catastrophic decline in honeybees. Now that bee numbers are hitting records, regulators are left without a rationale for bans or moratoriums on neonics, the advocacy narrative has changed course. Ban proponents have now declared a new crisis. The catastrophic decline isn’t with honeybees, they claim; it’s with wild bees.

Fuel to that thesis came with the April publication of a new Nature study by Swedish scientist Maj Rundlöf. The study is really in two parts: one for honeybees and one for wild bees. The well-designed honeybee study confirmed findings of multiple other field studies, demonstrating that neonicotinoids have no effect on honeybees–a finding that sent shockwaves through advocacy groups which have long maintained honey bees are in crisis and neonics are the major culprit.

The other part of the study, which looked at wild bees, bumble bees and solitary bees, appears as if it was tacked on after results from the honeybee study started coming in, effectively kicking the legs out of the central thesis of anti-neonic activist groups. Rundlöf claimed to have found half as many wild bees per square meter in neonic treated fields as there were in untreated fields, but there were numerous odd study elements. The bumblebee studies were inconsistent with earlier trials conducted by both the UK and industry; control fields and test fields were often sprayed with different pesticides; and very small bee populations were used. For instance, only 12 solitary bee females were placed into each field and only 5 on average hatched during the study, not enough to draw meaningful conclusions.

Perhaps as expected, as the link between neonics and adverse honeybee health becomes less and less plausible, advocacy groups have begun switching their narrative almost entirely, hyping the anomalous Swedish study about wild bees and pretending as if their past hyperbolic narrative about honeybees were just so yesterday.

“There’s no question that these super-toxic pesticides are taking a heavy toll on imperiled native pollinators around the world,” said Jonathan Evans, Environmental Health legal director at the Center for Biological Diversity. “Native pollinators are a critical link in our food web. We need the EPA to step up and take action to ban these dangerous chemicals before it’s too late to save our wild bees.”

Other advocacy groups are somewhat more circumspect. Jennifer Sass, of the Natural Resource Defense Council, acknowledged in a webinar put on by Northeastern IPM Center that there is no data available showing the decline of wild bees, saying environmental groups can only “presume” that wild bees are in decline. But the science doesn’t back up that presumption.

The advantage to this new narrative is that there simply are no good statistics on wild bees. We don’t even know how many species of wild bees there are, let alone their numbers or the population trends over time. Except for several bumblebee species that have collapsed due to disease, no baseline data exist on indigenous bee populations in this country and how they are changing over time–just the kind of black box science that invites advocacy scare mongering.

There is every reason to believe, however, that the new crisis is just as thinly supported by science as the old one. A 2013 study published in the Proceedings of the National Academy of Sciences analyzed US native bee populations over a 140-year period. Only three of 187 native species had declined steeply, almost certainly due to a pathogen and not any pesticide. In Europe, wild bee populations have been in decline for nearly seventy years, but in recent decades the decline has slowed and in some cases turned around, even as the use of neonics has skyrocketed

A recent three-year study published in Nature, conducted by 58 scientists around the world, found that the wild bee species that pollinate crops (and which would therefore come into the greatest contact with neonics) are flourishing.

Sam Droege, a wild bee specialist at the US Geologic Service who has been tasked with preforming the first comprehensive survey ever of wild bee populations in the US, has said his surveys so far indicate that most wild bees are doing just fine.

Although bees are certainly not facing an apocalypse, they do face serious health concerns, most notably from nosema. Researchers suspect wild bees are becoming more susceptible to the fungal pathogen due to a lack of genetic diversity, which leads to the increased potential for inbreeding and genetic drift.

Politics of bees

The renewed controversy over bees, neonics and modern agriculture comes at a particularly critical policy juncture. The Environmental Protection Agency, prompted by now dated reports about threatened honeybees, announced this spring that no new agricultural uses would be allowed for neonics until its assessments of the pesticides is complete.

The agency also released a review of the use of neonics in soybeans, concluding, "There… are no clear or consistent economic benefits of neonicotinoid seed treatments in soybeans."

That prompted a sharp rebuke in May from the US Department of Agriculture, suggesting a behind-the-scenes inter-agency battle over the regulatory fate of neonics. Speaking on behalf of the USDA, Robert Johansson, acting chief economist, wrote:

EPA's release of the incomplete report has resulted in a plethora of articles, which cast doubt on the value of seed treatment and neonicotinoids for agricultural production and the choices made by farmers. … As a whole, USDA disagrees with that assessment. We believe that pest management strategies are made in consideration of pest pressures, climate, landscape, and numerous other factors.

The flood of recent studies challengingthe 'neonics kill bees' hypothesis may have delayed the release of the long-awaited White House Pollinator Task Force report, which activists thought might endorse a ban on neonicotionids. But with commercial honeybee colonies stabilized and growing, the May report recommended a more measured approach, committing funds to increase pollinator habitats while ordering the EPA to review the effects of pesticides on pollinators over the next two years.

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