

Carly Batts

November 15, 2013

Professor Croce

FSEM: Research Paper

Beeware

I walk up the front porch steps opening the screen door to a welcoming display of familiarity. My home has not changed in its ability to comfort me in over ten years, but as I walk through the living room, closing in on the backside of the house, I come to my favorite view, the one that spans the entire valley below. Or at least what's left of it. Big Ag companies have since bought up most of the land and have turned it into what they call a 'more productive landscape'. But I see through what they try and tell me is there, so instead of a 'more productive landscape' I see lies. In fact I see what's not there anymore. It's a countryside without the color; wildflowers no longer grow here, and the patterns by which the plants that do 'flourish' are now designed, are designed with intention rather than with a natural flow. Giving the eye of the beholder a rather boring picture, this picture is one of corn, and a few grains, these crops are the only things we can really grow anymore because they solely rely on wind pollination rather than pollination by bees.

All of these things defy the laws given to us by the cosmos; a lesson to society that we shouldn't be messing with something we barely understand. This landscape we now see is the result of the many things; it's just that we've decided to ignore these many things for over hundreds of years. One of these results is the fact that there has been a documented decline in the bee population since 1945. In 1945 the world had approximately five hundred and sixty billion bees, which compared to present day is a far greater number. In today's world we can only count about one hundred and twenty billion bees left to buzz, and if that doesn't scare you, the other research will (Barlett). My guess, having talked to multiple master beekeepers as well as having looked at scientific studies done by the USDA and many other reporting agencies, is that bees have experienced a

period of die outs; including Colony Collapse as the result of three variables which includes: urban sprawl, pesticides, and pathogens. The importance here, being that without our bees to do great works of pollination, we will have no choice but to witness a hundred and thirty crops disappear, which is 1/3 of the market's produce (On Earth Magazine). As a result it will take away over half of a traditional grocery store's consumable items (PRnewswire). And our livestock, which have already become very dependent on the unhealthy diet of corn will become even more so as a result, mainly because "seed for alfalfa and hay which feeds the dairy industry will no longer get pollinated" (Nature in Fragments). This inadvertently would make us even healthier, as there will be a lot fewer options for grass-fed meat. News flash, people. We will be entering a period of time that will later be called "The Mass Starvation". By 2025 it is projected that bees will have gone extinct! (Barlett) People are going to die and in large quantities as the human population by 2025 also is projected to be at it's highest, upwards of 8.1 billion people (USA Today) which is just shy of Earth's carrying capacity, holding at 9 billion inhabitants (Livescience.com). And not only will that be of concern, but so will our economy; annually the United States alone makes fifteen billion dollars in revenue from crops pollinated by bees (USDA).

Currently the amount of uncultivated land dwindles at unprecedented speeds, as the result of our ever-growing population. Approximately twenty-three million acres are used as part of the agricultural industry in America alone, which does not include land that is developed for residential needs, or the space used by commercial venues. (American Farmland). By limiting the amount of bee pasture available to our black and yellow friends their ability to gather pollen is challenged. This pollen, an increasingly

important commodity, is then used to support the hive with the bee's natural production of honey. It takes over two million flowers to make a pound of honey (Captainjohnshoney.com). And about thirty thousand bees are needed for the task of collecting pollen from flowers, which means that the population of bees is now having to rein in their rates of reproduction, as well as their honey production to support themselves. This ultimately means that they have come to a time similar to one that has been projected for us, "The Mass Starvation", subsisting on what little is left within the confines of an urbanized landscape. And as unfortunate as this all sounds they really have no choice they can only fly up to fifteen miles away from their hive, limiting them even further.

Nothing about living in close contact with humans is beneficial for bees. You could even go so far as to say that we are in a parasitic relationship with them, reaping the liquid gold while they ring the death toll. Tom Barlett, master beekeeper for Volusia County, says that for every time the 'caring' hands of a hobbyist or commercial beekeeper pulls out a frame from within his hive he loses one to two days in honey production. But not only has the beekeeper put himself behind in production, he has also given himself a fifty percent chance of having killed his hive's queen. This often happens when a beekeeper pulls the frames out too quickly to show off the hive, to get the job of collecting honey, and to inspect his brood more quickly. Resulting in the injury of his own bees, as they get 'rolled' in the process. This term of 'rolling' describes the action of the bees, and possibly their queen, tumbling down a frame often to their injury or their own squishy demise. A queen by definition is the pride and joy of every apiary, and you would never want to do something that would hurt her as she is the one most responsible

for laying the next generation. This brood usually consists of over two thousand babies a day during peak harvest; this peak harvest depending on the region falls somewhere between the months of April and August. The purpose of this natural cycle is to ensure that casualties seen by the hive, as well as the death of old bees, can be replaced.

Worker bees only live to be about thirty or forty days old; this all depending on their sex and job within the hive. On the other hand, Queen bees live the longest with their life spans averaging from one year to five years independent of causalities (PawNation.com). If a queen has reached the end of her lifespan though the hive will know long beforehand, usually because of the pheromones that she produces, which normally relay the instructions throughout the hive. Normally these instructions delegate when to collect pollen, when to swarm and when to pick through the brood for defective young. But when a queen is dying, these instructions become weaker, less sure, and this to a trained eye is easy to detect, as the hive will look and seem more chaotic. At this point in the hive's life cycle there will be another queen forming somewhere deep in the recesses of the breeding comb, comb that does not hold honey, but instead holds cells full of young. The problem here is that this life cycle is inductive to failure because this system relies on the support of every individual within the community to survive. And when one individual cannot get enough pollen to support him or her self, it means that another bee will have to share what little he has, and so on, an active problem of urban sprawl.

Urban sprawl has not only been an issue for bees as far as land development goes, but as well as pesticides go. And we all know just how well pesticides go. Yes, these products offered by Bayer and Monsanto seem to spray on easy, delivering a pretty

product to market. But what does that all matter when we ingest these concoctions that are made to kill living breathing things like us? What happens when we are exposed to it on the daily? Will we build a resistance to the agricultural industry; the bees certainly haven't so why should we expect ourselves to? By eating fruits and vegetables that have been anointed by these sprays, we accumulate amounts to toxic levels, levels that make us sick. Cancer, many people believe, is the result of these bodily pollutants.

Amazingly, all of the problems including cancer, and ecological waste have had a positive correlation with the release of pesticides. Pesticides, which are basically just a host of liquid chemicals are sprayed on plants to deter bugs and varmint from feasting on the crops. This essentially has allowed the farmer to give uniformity to his produce, free from the natural defects that normally mark fruits and vegetables. The value of this consistency is that it has given fruit an almost attractive appeal to the consumer, shaping the market in a way that provokes us to buy produce based off of looks alone rather than it's nutritional value. What Americans would be smart to remember though is that the devil always looks good. When pesticides first came out, they had little testing done in a longitudinal setting, yet they were scooped up by the market and used with abandon on the invaluable soil.

And because of this great haste, blindly mixed with rash decisions, we have concocted ourselves quite the toxic mess. Pesticides kill all the things that are most important to the environment like our frogs, lightning bugs, crickets, butterflies, and most importantly, our bees. Colony collapse syndrome is an ever-increasing problem in the U.S, as documented in a study done by the USDA from 2008 until present day this is mostly thought to be what it is today because of the association bees have with the

pesticides. The association between the two is in part because of the close proximity bees experience because so many of them live in agricultural areas; areas that people think where bees belong. So even though bees can smell sixty times better than human beings, they have not learned to differentiate between the smell of pesticides and the smell of flowers. Thus they have landed on many a contaminated flower, often times because they just have no way of knowing the danger involved. And even if they did where would they go? There's hardly an organic aisle for them to shop for their protein.

The aisle bees find themselves shopping down are usually ones derived from Neonicotinoids; "a relatively new class of insecticides that share a common mode of action that affects the central nervous system of insects resulting in paralysis and death" (beyondpesticides.org). Seemingly, these bees lose all sense of direction as well as bodily function in less than five minutes. This leads many scientists to believe that the bees who never return to the hive have come in contact with these chemicals. Which is essentially the main symptom of a hive experiencing colony collapse:

"When colonies are large it is likely that they can support some loss of workers. However, in the spring when queens are foraging, and subsequently when nests are small and contain just a few workers, mortality may have a more significant effect. Thus spring applications of pesticides are of particular concern" (Bumblebees).

The problem is that the majority of pesticides are used during the springtime. So where do we give? We can't request that plants germinate during the winter when bees aren't out, and we can't ask that bees change their natural patterns to collect pollen when pesticides aren't being sprayed. Another facet to the problem is that these chemicals aren't ones used in just agricultural areas; homeowners in residential areas are using them to promote greener grasses for their lawns as well. The average homeowner has no idea,

when it comes to determining how much pesticide is too much. It is estimated that more than 70% of homeowners use too strong of concentrations on their lawn than needed (USDA). With our use of pesticides we are essentially blockading the bees just as the Germans did in World War II to the Dutch, starving out many a people because they simple had no options left. Similarly this same phenomenon is happening to the bees, as they clearly have no alternatives left.

So although pesticides, and urban sprawl are two factors as to why we are experiencing bee loss, there is still one more element to be examined and that element resides within the world of microorganisms. You see pathogens don't just affect humans, they affect bees too. And unfortunately, they have since mutated into a resistive state as the result of pesticide use. Ironically enough, these pesticides were first used to eradicate pathogens, but now that has backfired. Mites which suck the bees' blood, have been able to develop the most resistance to chemical killers, which in a way is good because it is has forced us as a society to innovate sustainably. For example a beekeeper from honeybeonline.com, Sheri Burns states that instead of allowing her honey to become contaminated with the necessary chemicals to disrupt the Verona mites, she uses a technique that instead allows her to freeze the frames. By freezing the individual frames that contain honey and brood, she is able to kill all the Verona mites that have embedded themselves in the comb in one fell swoop. This allows her to use a solely organic technique to dislodge her hive's problems. Everything else seems to just create backlash, whether we like it or not. Now don't misinterpret my point, scientific thinking is not bad, it still qualifies itself as innovative thinking however it limits us to a more industrial type of solution. Such as the one that was delivered to us in 1945, which resulted in books like

Rachel Carson's *Silent Spring* which predicated that pesticides were the reason why we were seeing ruin within the environment.

So what can we do to draw attention to this important matter? We certainly can't ask the bees to go on a hunger strike. Well luckily for us, there are many alternatives to pesticides out there, it's just a matter of whether or not we decide to lead or follow. Germany has already made a move to ban the use of neonicotinoids after having experienced a major decline of bees in 2008 which was subsequently related to it's subclass pesticide: clothianidin (Beyond Pesticides). Unfortunately though pesticides are given registration by the government to be used in ten-year periods unless said otherwise. So it won't be until 2017 that Americans will really have another chance to ban their use. But that doesn't mean we shouldn't fight against them. As individuals we all have this certain thing called free will, which gives us the choice to use a more holistic route sans pesticides. Having spoken to beekeeper Michael Baulberg of two and a half years in an interview during Stetson's green market one Sunday morning, I can now confidently say that hope is out there for a successful agricultural industry without a chemical malaise. You see, Mr. Baulberg told me that he himself combats the use of pesticides by hauling three gallons of purified water to each of his hives daily in an attempt to deter bees from drinking from the neighbor's chlorinated pool, or from the stagnant puddle down the street. This water is the resource by which his bees later use to produce the honey that he sells.

Think about it: what all else are bees coming into contact when they are out and about, because that's what they are putting into their final products; like the honey we eat! Baulberg also told me that under the United States regulations for livestock that he is

allowed to sue anyone who uses pesticides within a mile of his bees, still plenty within the radius by which a bee could fly. But at least it's a start. He says his biggest problem is actually the county, with their mosquito control tactics, as they use a chemical that kills everything that it comes in contact by attacking the organism's nervous system. He told me that they even kill the dragonflies with this spray; a dragonfly is a mosquito's natural predator. Oddly enough though, he's most sad not about the insects dying, but rather the times that he watches the small children of his neighborhood play behind the mosquito truck as it sprays. As he knows that there is just no way that they can be doing this without sustaining some sort of neurological damage. So the next time someone complains about America's failing test scores, and prevalence of ADHD and other disorders among the youth, maybe we should consider the possibility that it's not our education system or parenting that needs to be fixed. It's the environment that we have allowed our children to grow up in that needs to be fixed. "By one estimate the average young American carries at least 190 chlorinated organic chemicals in his or her fatty tissues and bloodstream and another 700 additional contaminants as yet uncharacterized" (Orr). Which is why our main concern should be the bees, if we can clean up our environment back to levels at which a bee can survive then without a doubt human health will start to rise. More importantly though, is the fact that, without then, there won't even be enough food for these future generations to survive infancy. The solution to our growing difficulty must be threefold: first it will have to tackle pathogens, second it will have to disperse the use of pesticides and third, we will have to persuade the people who continue to urban sprawl in a unsustainable way to do something different.

Convincing the people of our time that this should be a part of their priorities

won't be easy. But it won't be hard either; instead I predict that it will be just right. By showing them the facts concerning bee loss, they will become fearful. But leaving them in fear is not an adequate solution, for at the same time you have to give them hope, for they will only continue to try if they have hope, doing so from a place of love. For "When we love, we always strive to become better than we are. When we strive to become better than we are, everything around us becomes better too" (goodreads.com). Which really just means that we just need to find a way to convince people to see something in the bees that they love, whatever that may be their color, sound, ability, or their produce. Because people won't let what they love leave. So dear reader, as we part ways I only have one thing to say and that is: Peace bee with you.

Work Cited:

Aston, Adam. "She's a Genius for Honey Bees." *OnEarth Magazine*. N.p., 05 Oct. 2010.

Web. 6 Nov. 2013.

"BEE Protective Pollinators and Pesticides." *Beyond Pesticides*. N.p., 20 Feb. 2011. Web.

7 Nov. 2013.

Barlett, Tom. Master Beekeeper. Carly Batts. Interview. 7. Nov. 2013.

Baulberg, Michael. Beekeeper. Carly Batts. Interview. 20. Oct. 2013

Burns, Sheri. "Welcome To Basic Beekeeping Lesson 39 Controlling Varroa Mite

Without Medication." *Varroa Mite*. Long Lane Honeybee Farms, 16 Aug. 2013.

Web. 11 Nov. 2013.

Coelho, Paul. "Quotes About Hope." (*2165 Quotes*). The Alchemist, 08 Apr. 2013. Web.

4 Nov. 2013.

"Farmland Protection - Farmland by the Numbers." *American Farmland Trust*. N.p., 18

Jan. 2012. Web. 2 Nov. 2013.

Goulson, Dave. *Bumblebees: Behaviour, Ecology, and Conservation*. Oxford [England:

Oxford UP, 2010. Print.

Johnson, Elizabeth A., and Michael W. Klemens. *Nature in Fragments: The Legacy of Sprawl*. New York: Columbia UP, 2005. Print.

Kaplan, Kim. "Related Topics." *USDA*. Agricultural Research Service, 17 Dec. 2010. Web. 7 Nov. 2013.

Masters, Madeline. "On Average How Long Does a Queen Bee Live?" *Animals.PawNation*. Demand Media, 17 Sept. 2009. Web. 5 Nov. 2013.

Orr, David W. "Loving Children: The Political Economy of Design." *The Nature of Design: Ecology, Culture, and Human Intention*. New York: Oxford UP, 2002. 199. Print.

Samson, John R. "Honey Trivia." *Honey Trivia*. N.p., 2003. Web. 2 Nov. 2013.

Spector, Dina. "What Our World Would Look Like Without Honeybees." *Business Insider*. N.p., 22 June 2013. Web. 2 Nov. 2013.

"This Is What Your Grocery Store Looks like without Bees." *PR Newswire*. Whole Foods Market, 12 June 2013. Web. 3 Nov. 2013.

"U.N.: World Population to Reach 8.1B in 2025." *USA Today*. Gannett, 13 June 2013.

Web. 1 Nov. 2013.

Wolchover, Natalie. "How Many People Can Earth Support?" *LiveScience.com*. N.p., 11

Oct. 2011. Web. 01 Nov. 2013.