Honey Bees Not Healthy in U. S. or U. K.

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- Jerry Hayes, President, Apiary Inspectors of America

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- Aaron Colangelo, NRDC Sr. Attorney

Western honey bees, or European honey bees (*Apis mellifera*), are still weak, unhealthy and continue to disappear in massive numbers since Colony Collapse Disorder (CCD) was identified in the fall of 2006. At least one-third of all the commercial honey bee colonies in the United States and United Kingdom have collapsed as of 2008. There might not be enough pollinators for the 2009 season, forcing food growers to seek out other pollinators in Australia, Argentina and perhaps even the Africanized bees based in Mexico that have spread north into the southern United States.
Honey bee image © 2007 by Matt Cardy/Getty.

August 31, 2008 Gainesville, Florida - It was 18 months ago in February 2007 at Earthfiles that I reported my first interviews with Penn State and University of Pennsylvania scientists about honey bee disappearances that came to be known as "Colony Collapse Disorder," or CCD. [See: **022307 Earthfiles.**] I also interviewed David Hackenberg, a beekeeper from Pennsylvania, about his massive disappearance of honey bees. That fall of 2006, Dave Hackenberg lost 60% of his bee colonies; in 2007 he lost 80% of his bees and went into debt to stay in business. He told me, "I am trying to stay as far away from all those nicotine-based chemicals as I can." He had become convinced that those pesticides (such as Imidicloprid and Clothianidin) were the main problem in the disappearance of his bees.

[Editor's Note: **Clothianidin** (Poncho®, Poncho®Beta, Prosper®), developed by Takeda Chemical Industries and Bayer, a German chemical and pharmaceutical company that is currently the third largest pharmaceutical company in the world. Nicotin-based chemical composition is: (E)-1-(2-Chlor-1,3- thiazol-5-ylmethyl)- 3-methyl-2-nitroguanidine.

Clothianidin is being studied regarding mass die-offs of honeybees in some parts of Europe. Use of clothianidin was prohibited by the German Federal Office of Consumer Protection and Food Safety on May 15, 2008, until new studies can prove the innocuousness of the product. Like imidacloprid which was approved first fifteen years ago, clothianidin focuses on the insect's nervous system, causing paralysis and death.

Imidacloprid (Gaucho® for seed treatment on wheat, Provado® for tomatoes, Admire® for potatoes, Grubex® for control of grubs, and Premise®

for control of subterranean termites and carpenter ants. It is also the active ingredient in Advantage®, the best selling product for the control of fleas on dogs, cats and other pets). Imidacloprid, a systemic, chloro-nicotinyl compound which was developed in 1989 by Bayer A.G. and has since become the No. 1 active ingredient in insecticides around the world. Nicotin-based chemical composition is: N-[1-[(6-Chloro-3-pyridyl)methyl]-4,5-dihydroimidazol-2-yl]nitramide.

Recently Bayer and Pursell Industries, Inc., a company with 95 years of experience in the lawn and garden business, have formed a new company, Bayer-Pursell, LLC, to co-market products using the imidacloprid ingredient to the U.S. consumer market in a product called "Merit." Together, they are introducing the brand, Bayer Advanced™, designed for home garden use.

Imidacloprid works by interfering with the transmission of stimuli in the insect's nervous system. Specifically, it causes a blockage in a type of neuronal pathway (nicotinergic) that is more abundant in insects than in warm-blooded animals (making the chemical selectively more toxic to insects than warm-blooded animals). This blockage leads to the accumulation of acetylcholine, an important neurotransmitter, resulting in the insect's paralysis, and eventual death. It is effective on contact and via stomach action.]

This summer of 2008, the British Beekeepers Association (BBKA) reports that about 33% of English honey bee hives did not survive the winter of 2007 to spring 2008. The U. K. Honey Association warns that English honey will run out by Christmas and no more will be available until the 2009 summer.

The United States faces the same continuing honey bee crisis. To everyone's surprise, no specific cause of CCD has yet been found. But perhaps the most insidious killer of all could be those nicotine-based pesticides that scare Dave Hackenberg and that European researchers say interferes with honey bee memories. If so, that could be why the honey bees keep disappearing – their memories are damaged and the bees can't find their way back to their hives. That research is why France banned some nicotine-based pesticides in 1999 and 2003 and Germany finally banned some in 2008.

Back in 2003 and the United States, the Environmental Protection Agency (EPA) approved registration of a new nicotine-based pesticide called Clothianidin (Poncho®, Poncho®Beta, Prosper®), developed by Takeda Chemical Industries and Bayer, a German chemical and pharmaceutical company that is currently the third largest pharmaceutical company in the world.

NRDC Lawsuit Against EPA and German Legal Complaint Against Bayer Crop Science

Two weeks ago, on August 13, 2008, German beekeepers and a consumer advocate group filed a legal complaint against Bayer Crop Science to determine how much Bayer really knows about the impact of the nicotine-based pesticide Clothianidin on the deaths and disappearances of millions of honey bees around the world.

Clothianidin and related nicotine-based pesticides generated about $1 billion of Bayer's $8.6 billion in global sales for 2007. The coalition's attorney, Harro Schultze, said, "We suspect that Bayer submitted flawed studies to play down the risks of nicotine-based pesticide residues in treated crops." Under German law, a criminal investigation can lead to a physical search of Bayer's offices.

Nicotine-based pesticides are also what American beekeepers were worried about in the fall of 2006 when their bees began disappearing in massive numbers. That's when the University of Pennsylvania contacted the Environmental Protection Agency to get the EPA's original data about Bayer's Clothianidin to learn why EPA approved registration of the nicotine-based pesticide in 2003.

When months passed without EPA sending the important data to the University of Pennsylvania Colony Collapse Disorder researchers, attorneys at the National Resources Defense Council (NRDC) were contacted to file Freedom of Information Act requests with EPA, a federal agency that by law is required to answer FOIA inquiries. But EPA did not reply with the Clothianidin data.

Now, after months of waiting, the NRDC went to court on Monday, August 18, 2008, and filed a lawsuit to "uncover critical information that the U. S. government is withholding

about the risks posed by nicotine-based pesticides to honey bees. EPA should be evaluating the risks to bees before approving new pesticides, but now refuses to tell the public what it knows. Pesticide restrictions might be at the heart of the solution to this growing honey bee crisis, so why hide the information that EPA should be using to make those decisions?"

Beekeepers and scientists hoped by the spring of 2008 that CCD might be over. But it's not. In August 2008, beekeepers on the Pacific Coast have reported massive honey bee disappearances. The consensus of apiary experts is that there might be barely enough honey bees to get through almond pollination in a few months. But maybe not. If not, that means the huge California almond industry will reach out to other countries, such as Australia and Argentina to fill the gap left by all the disappearing North American honey bees. Ironically, it was importing bees from Australia that brought the Israeli Acute Paralysis Virus to the United States. What other devastating microbes could come with imported bees when our American honey bees are so weak and declining?

Recently I talked with Jerry Hayes, Chief of the Apiary Section in Florida's Department of Agriculture and President of the Apiary Inspectors of America, based in Gainesville, Florida. I asked Mr. Hayes what his professional assessment is now of honey bee health in the United States.

Interview:

Jerry Hayes, Chief, Apiary Section, Florida Department of Agriculture and President, Apiary Inspectors of America, Gainesville, Florida: "I don't think anybody would say these systemic pesticides are a good thing for honey bee colonies or other pollinators. Certainly, we are looking at nicotine-based pesticides more closely. Of course, there are a lot of people tippy-toeing around because you are talking about large chemical companies and what political power they might have over the power of the purse to purchase the research that will help them out.

IS IT TRUE THAT THE NICOTINE-BASED PESTICIDES STAY IN SOILS AND PLANTS LONGER THAN THE MAKERS OF THEM EVER THOUGHT?

Yes, they do, depending on the type of soil – whether it's a sandy or clay soil. But I think there is a realization now that the nicotine-based pesticides do hang around longer. And being systemic, they are in the nectar and pollen – not in lethal doses, but sub-lethal doses.

What happens to a honey bee when it's exposed to sub-lethal doses of a chemical 24/7/365? That's what we don't understand at this point in time.

HAS THERE BEEN ANY MORE RESEARCH ON NICOTINE-BASED PESTICIDES INTERFERING WITH THE MEMORIES OF HONEY BEES SO BADLY THAT IT COULD EXPLAIN WHY THEY DON'T GET BACK TO THE HIVE?

There is some good data out of Europe primarily that seems to indicate that short-term memory is significantly affected. I don't know that any of my colleagues would have any disagreement with that data. I think we're all shooting ourselves in the foot.

MEANING THAT IF IT IS NICOTINE-BASSED PESTICIDES AND THEY ARE STILL BEING USED AND HAVE A LONGER LIFE IN THE SOIL AND PLANTS THAT CAN HURT THE HONEY BEES, THE LONGER COLONY COLLAPSE DISORDER WILL GO ON?

Yes. Not only honey bees, but think of all the solitary bees and butterflies and other pollinators that would be accessing the same nectar and pollen that honey bees are as they go to flowers, the universal food source for pollinators. In an agricultural setting, when you restrict honey bees, for instance, to collecting pollen from 500 acres of cucumbers that are being treated with a pesticide, that means that bee colony has to feed on that collected pollen for X period of weeks or months, using it to feed their young over that time. And this is not normal. Honey bees and other pollinators are like us – we need the food pyramid. We need different sources of protein, vitamins and minerals and honey bees are o different. But when you force them to get in an agricultural setting and feed and forage on one particular type of crop, that's not good for the bees nutritionally. Then if the nutrition has various chemical pesticide residues in it that the honey bees have to eat for weeks or months, that exacerbates the problem.

What Are California Almond Growers Going to Do for Pollination in 2009?

The almond pollination is driving most of the commercial beekeeper industry now and I don't know how much additional acreage is going to be coming on line this coming spring. But we're getting to the key point here soon about whether there is going to be enough pollinators for the coming almond pollination or not enough.

And our friends to the north, the Canadians, have brought in Australian and New Zealand bees and now I think they are going to start bringing in some Argentinean bees not knowing what those will be bringing into the United States. But, the almond growers will not be denied! You're not going to be able to tell the almond people they aren't going to be able to produce an almond crop.

THE BOTTOM LINE IN 2008 IS: THERE AREN'T REALLY ENOUGH UNITED STATES HONEY BEES TO POLLINATE ALL OF THE NEEDS FROM ALMONDS TO BERRIES GOING INTO 2009 WITHOUT IMPORTING BEES THAT MIGHT BRING WITH THEM MORE PROBLEMS?

Yes, I think that's probably accurate. We're very close to the breaking point of what's enough and what's not enough. Honey bees are not healthy.

Honey Bees Now "Are A Shadow of What They Were"

When I started in this business 25 or 30 years ago, things with honey bees were different. I can't explain the difference how different the honey bees looked, the size of colonies, the vitality, the vigor of bees 25 years ago compared to our honey bee colonies now that are still colonies, but honey bees today in the United States are just a shadow of what they looked like 25 years ago.

IF HONEY BEES IN NORTH AMERICA ARE A SHADOW OF WHAT THEY WERE 25 YEARS AGO, WHAT HAPPENS TO THE LARGE COMMERCIAL FOOD PRODUCERS – WHAT ARE THEY GOING TO DO FOR POLLINATORS?

Like they've done everything else in the United States – they will outsource that production. We can still grow a lot of wheat, corn and rice – those wind-pollinated crops – but it certainly might be a struggle to maintain the huge diversity of fruits and vegetables that we have now just because you won't have the pollinators to take care of it. Or, genetic engineering from these other big seed companies – I'm sure they are also going to try to develop fruits and vegetables that don't need pollinators and bypass that altogether.

WHICH RAISES MORE QUESTIONS ABOUT WHETHER GENETICALLY MODIFIED FOODS DO HAVE A NEGATIVE IMPACT ON HUMANS AND EATING THEM.

Yes. (laughs) We're so smart and ignorant at the same time. We do not know that and I'm sure some of it will be good and some of it will scare the pants off of you.

WHAT YOU ARE ALSO SAYING IS IF WE ARE NOW IN A PERSISTENT, UNRELENTING PERIOD WHERE THE POLLINATORS ARE DECLINING AND BECOMING WEAKER EVERY YEAR, THEN THE FOOD INDUSTRY IS GOING TO BE FORCED TO KEEP IMPORTING FOODS FROM OTHER COUNTRIES?

When you look to other countries, they are really lax and would really scare you and you would really want to wash your vegetables a lot!

BECAUSE OF SALMONELLA AND *E. COLI* PROBLEMS?

Yes and because of chemical use that was banned in the United States a long time ago because those banned chemicals were too scary for us to use.

I think honey bees are the tip of the iceberg. Look at the losses we have had in honey bees and then look at those who study solitary bees and other pollinators. We've lost certain species of bumblebees to extinction already and other species of pollinators are gone.

When you look at these small insects, it makes me personally worried about the affects on larger animals like you and me and our kids and grandchildren and cows and horses and so on. I think we're doing some things that are not good for us. Are we smart enough to say, 'Whoop, this is a mistake!' and back up?

Is United States Going to Become Dependent On Foreign Food As It Has Become Dependent On Foreign Oil?

I know the USDA projects by 2012 to 2015 that something like 40% of our vegetables would be coming from somewhere else. I'm glad that gas prices are going down, but by the same token, we've turned that (fossil fuels) production over to somebody else. And now we're going to turn our food production over to someone else?! (laughs ironically) Talk about a dumb-headed move. I can't believe anyone in their right mind would say, 'Oh, this is a great idea.'

But then you have our Secretary of Agriculture. He was asked by somebody, 'What about honey bees?' And he said, 'We have some really good guys tinkering around with it at the USDA.'

So, when something like that comes out of our Secretary of Agriculture's mouth, you know that things are not good.

IT'S NOT HIGH ON HIS PRIORITY LIST?

No, it doesn't sound like it.

THAT'S INCREDIBLE FOR A SECRETARY OF AGRICULTURE TO SAY SINCE POLLINATION IS SO CRITICAL.

Well, yeah! (laughs)

WHAT IS HIGH ON HIS PRIORITY LIST?

You've got me!"

In May 2008, there was a Congressional meeting in Washington to discuss the honey bee crisis. One of the presenters to the committee was a cucumber grower from North Carolina. He told the committee, "I have all this land, but I can't plant all of it even though I know the United States needs cucumbers. The reason is I don't have enough bees to pollinate my cucumbers. So I only grow what I have enough bees to pollinate."

The recently passed 2008 Farm Bill authorized $4.1 million to a scientist in the Univ. of Georgia-Athens, who is going to study the DNA of the varroa mite to see if there is someway to weaken the mites that are parasitic to honey bees. But the varroa mites are not the answer to Colony Collapse Disorder. The mites can move in on bees so easily because the honey bee immune systems are so weakened.

Hopefully, the German beekeepers legal complaint against Bayer and the Natural Resources Defense Council's lawsuit against EPA will finally lead to some honest answers about nicotine-based pesticides. The odds are that Dave Hackenberg in Pennsylvania was right two years ago. He and other American, French and German beekeepers learned by experience long ago that Clothianidin, Imidacloprid and other nicotine-based pesticides hurt their bees. If the U. S. Environmental Protection Agency is going to live up to its name, it should release its Clothianidin lab data immediately. Otherwise, it's an American tax-payer-financed agency that is hiding information critical to understanding the decline of honey bees and other pollinators important to the national security of the whole world.

More Information:

For further information about threatened honey bees and other pollinators, please see reports below in **Earthfiles Archive**:

- 04/10/2008 — Honey Bee Collapse Now Worse on West Coast
- 02/29/2008 — Mysterious Bat Deaths in New York, Vermont and Massachusetts
- 01/18/2008 — Amphibians Dying Out At Alarming Rate
- 10/13/2007 — Now Bumblebees Are Disappearing, Too.
- 09/26/2007 — North American Honey Bees Still Weak
- 09/18/2007 — E. coli and Salmonella Continue to Threaten American Bagged Salad Greens
- 09/07/2007 — Honey Bee DNA Study Finds Australian Virus in Colony Collapse Disorder
- 07/11/2007 — Mystery of Night Shining Clouds - Another Global Warming Change?
- 06/28/2007 — Hackenberg Apiary, Pennsylvania - 75-80% Honey Bee Loss in 2007. What Happens If Colony Collapse Disorder Returns?
- 05/04/2007 — Environmental Emergency Updates: Part 1 - Spreading Honey Bee Disappearances - Nosema ceranae Not the Answer?

- 04/06/2007 — Collapse of Honey Bees in U. S., Canada and 9 European Countries
- 03/17/2007 — Honey Bee Disappearances Continue: Could Pesticides Play A Role?
- 02/23/2007 — Part 1: Earth Life Threats - Alarming Disappearance of Honey Bees

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Websites:

AAAS Science Journal: **http://www.sciencemag.org/cgi/content/summary/317/5843/1304**

Truth Behind Insecticide "Merit": **http://www.rosemania.com/Pesticide_update.htm**

Mid-Atlantic Apiculture Research and Extension Consortium (MAAREC): **http://maarec.cas.psu.edu/**

Colony Collapse Disorder (CCD): **http://www.ento.psu.edu/MAAREC/pressReleases/CCDSummaryWG0207.pdf**

Apiary Inspectors of America (AIA): **http://www.apiaryinspectors.org/**

Biology of Honey Bees: **http://plantphys.info/Plants_Human/bees/bees.html**

Varroa Mites: **http://www.uky.edu/Ag/Entomology/entfacts/struct/ef608.htm**

Honey Bee Tracheal Mites: **http://creatures.ifas.ufl.edu/misc/bees/tracheal_mite.htm**

National Bee Loss Survey: **http://beealert.blackfoot.net/~beealert/surveys/index.php**

American Beekeeping Federation: **http://www.abfnet.org/**

American Honey Producers Assoc.: **http://www.americanhoneyproducers.org/**

The Xerces Society (Pollinators At Risk): **http://www.xerces.org/Pollinator_Insect_Conservation/pollinators_at_risk.html**

American Assoc. of Professional Apiculturists: **http://entomology.ucdavis.edu/aapa/aapapubs.cfm**

Bee Culture, The Magazine of American Beekeeping
http://www.beeculture.com

Credits