STEVE ELLIS
Remarks for the First International Conference on
Pollinator Health, Biology and Policy
Penn State University
July 26, 2010

"A Beekeeper's Perspective on U.S. Pesticide Policy"

My name is Steve Ellis. I am a commercial migratory beekeeper from Minnesota. My bees overwinter in California. I am here today representing the National Honey Bee Advisory Board or NHBAB. The NHBAB is a group of eight beekeepers selected from the two national beekeeping organizations in the United States.: the American Beekeeping Federation and the American Honey Producers Association. The scientific advisor to our group is Jim Frazier from Penn State.

Our charge is to address beekeeper concerns with pesticides and honeybee health. All of the members of the NHBAB have 25 or more years of commercial beekeeping experience and provide hives for commercial pollination of many agricultural crops including almonds, cherries, apples, alfalfa seed, cranberries, blueberries, cotton seed, cucumbers, squash, pumpkins, and onion seed. Many of us also produce honey from clover, sage, citrus, palmetto, gallberry, tupelo, cotton, and various wildflowers. We feed our families and the world from the labors of our honeybees. Beekeeping is a lifestyle, and most beekeepers love what we do.

The NHBAB is tremendously appreciative of the work done here at Penn State University: Jim and Maryann Frazier, Chris Mullin, Diana Cox-Foster, Dennis Van Engelsdorp and everyone who is currently part of the Center for Pollinator Research have initiated very important work. We are very pleased to see so many of you come to this conference to work on the problems facing all pollinators. We need your help. We also wish to make sure that beekeepers are included in these discussions. We believe that our field experience and day-to-day exposure working with honeybees gives us a unique perspective. We are excited to work with many of you to combine our insights and valuable observations with your scientific abilities in an effort to improve pollinator health.

I am sure that most of you are familiar with the term Colony Collapse Disorder (CCD) and the devastation caused by the dramatic sudden losses of managed honeybees in the United States and in many other countries. For the past three years, Apiary Inspectors of America (AIA) reports indicate that more than 30% of the managed hives in the U.S. have been lost between October and April. Most experts predict that this level of mortality is unsustainable. For those of us struggling to keep our bees alive, it has been a real challenge.

In the process of searching for answers to the CCD riddle, the NHBAB was born. Beekeepers are not normally activists. Most of us prefer to spend our time in the field

rather than in meetings or political events. The current problems we are experiencing have forced us to reach out for help from groups that we may not typically have worked with in government and scientific research.

Beekeepers suspect that there is a link between these strange mortalities in their bees and new chemicals being used in agriculture. Increasingly, beekeepers are reporting that their bees in the wilds or woods are healthier than their hives exposed to intensively managed agricultural environments. Pesticides and pesticide policy issues were the subject that the NHBAB was set up to address. Each of the members of NHBAB can tell their own story of "two sets of hives," and consistently the hives exposed to agricultural environments express much higher collapse. Many of us have left our traditional honey producing areas or crop pollinations to find "cleaner pastures." This has resulted in healthier bees. If Dickens were to write this story--"A Tale of Two Beehives"--it would not be set in London, but the story could easily fit in many of our bee locations.

My own experiences with agricultural pesticides and honey bees began in the summer of 1998 when I first noticed pesticide injury to my bee yards. With the encouragement of my state bee inspector, I had the State of Minnesota Department of Agriculture sample my dead bees and discovered the presence of the chemical Carbaryl. Carbaryl, I learned, is a widely used agricultural insecticide. In this instance, the chemical was applied to hybrid poplar trees for the control of cottonwood leaf beetles.

After six years of legal work performed by three separate law firms, in 2005 I found myself listening to arguments before the Minnesota Supreme Court. To my knowledge, the decision rendered by the Minnesota Supreme Court remains the highest-ranking statement made by our court system addressing responsibility for pesticide poisoning of honey bees in the United States.

In their decision, the Minnesota Supreme Court ruled that "honey bees that enter fields treated with pesticides are not trespassers, but foragers owed reasonable protection from harm by applicators and property owners." Observers say that allowing beekeepers to sue for damages to their hives sets a significant precedent for other such cases around the country.

The Minnesota DNR (Department of Natural Resources) settled the case in mediation shortly after the Supreme Court's decision. They agreed to not use Carbaryl in the future in their groves of hybrid poplar trees, to work with beekeepers and NAPPC (North American Pollinator Protection Campaign) to develop a brochure on safe pollinator forestry practices, and settle damages for an agreed cash payment. Additionally, I received the spray applicator's plane as partial payment of losses. The plane was not flight worthy and was sold off for parts.

The Minnesota experience with pesticides opened my eyes to the scale and scope of the pesticide pollinator problems all around the country. The need for the beekeeping industry to address these shortcomings of our national pesticide policy motivated the

formation of the National Honey Bee Advisory Board, for which I have served as secretary for the past two years.

I am here today speaking on the subject of national pesticide policy as it pertains to pollinators. To begin, I feel it is necessary to give a brief historical sketch. Beekeepers and honey bees have felt the effects of pesticides ever since they were first used. Early chemicals were arsenic, followed by organophosphates, then synthetic pyrethroids and finally now systemic pesticides and GMO's.

USDA started off with pollinator protection by developing "protective label language" or Bee Hazard Statements. These statements are still in effect and carry the weight of federal law. With the founding of EPA in 1970 and refinements of (FIFRA) Federal Insecticide Fungicide and Rodenticide Act regulations, EPA assumed authority to manage economic poisons. Enforcement authority was handed off to the states under primacy legislation passed in 1998. Defining and enforcing label language has proven to be a political "hot potato."

From their first introduction "environmental statements for honey bees" were predicated on the assumption that pollinator exposure to the given poison was preventable through timing of application. Everything hinged on <u>BLOOM</u>. Don't apply to bloom and you won't be killing pollinators.

The line sort of worked until the advent of microencapsulation. Products like Pencap M and Sevin XLR plus (Extra Long Residual) showed up with polymer coatings capable of extending residual life of the product. These coatings served another purpose, however, because they coated the chemical making it less immediately accessible to foragers. Because the poison is encapsulated, it initially is less toxic to foragers allowing it to be carried back to the hives in greater amounts. Problems often do not show up until bees tap into the stored poisons months and, sometimes, years later.

These products were the first real early warning signs that a line had been crossed. Beekeepers and toxicology researchers had long recognized the difference between chemical poisons that affected foragers and those which were transported back to the hive and affected the hive as a whole. Because of the regenerative nature of a queen bee capable of laying up to fifteen hundred eggs per day, hives could bounce back from loosing their field force. Poison brought back to the hive and fed to the young brood and queen is capable of sickening and killing the entire hive. Worse yet, the poisoned pollen stored in the dead equipment could remain toxic wreaking havoc in the next colony in which it was placed. Wax proved to be an effective, yet unfortunate binding source, capable of bonding with and storing many chemical compounds.

Arguments between beekeepers and regulators flared up on whether label language protections were effective. Beekeeper concerns started to pop up in places such as Nebraska, Washington, Colorado, North Carolina, Minnesota and other states related to the expanded use of such technologies. State departments of agriculture dealt with these

incidents as uprising, often choosing to try to put down the rebellion, rather than deal with the issues being raised.

Technologies continue to advance presenting expanded problems to pollinators. There has been a fundamental shift in how and why we use pesticides. The original concept was to eradicate a pest population when it became problematic. Today most of the emphasis is on pest prevention. Seed treating of chemicals allows for systemic protections through the whole plant. GMO technologies also provided the possibility to splice in a pesticide gene. Granulated, chemigated or injected systemic plant protection became hugely popular.

Coincidentally--or not--CCD appeared on the scene for the first time around 2004. Dave Hackenberg and researchers at Penn State led the way looking into the mysterious syndrome and tried to piece the puzzle together. Science often lags behind field observations. Dave became persuaded that these new systemics in the neonicotinoid class were to blame, and he has worked tirelessly ever since to alert others to the danger he perceives.

THE PROBLEM

Last January, I attended the national convention of the American Honey Producers Association in Sacramento, California. Steven Bradbury of the U.S. EPA was the keynote speaker. Ron Phipps gave an extensive "industry report" which was sobering by any measure. U.S. honey production hit a record low, number of managed hives was also at a record low, and the percent of hive mortality at a record high. Chart after chart documented the dire state of the bee industry. CCD remains a factor, still just a name without a proven definitive cause. The beekeeping industry in the United States of America is in a crisis that threatens our viability.

When confronted with a crisis, it can be difficult to know what needs to be done. Sticking our heads in the sand is one approach to pesticide policy in our country—that approach is not working. The NHBAB is asking for a reexamination of current pesticide policy. We believe this review is timely and necessary.

There currently is a division of opinion regarding the role pesticides are playing in CCD. Even among beekeepers some fall into the "anything but pesticides" camp. Clearly there are many possible suspects: Varroa mites, tracheal mites, nosema cerana, nosema apis, bee viruses, pathogens, even cell phones have been mentioned as a potential cause. Among the NHBAB, we have all heard from our employees that cell phones do indeed impact the health of managed honey bees. If the boss is on the cell phone all the time, the bee operation will be impacted.

The NHBAB believes that it is very likely that a link will be found between pesticides and CCD. Already studies performed first in France and replicated by Jeff Pettis in the U.S. have shown a linkage between exposure to Imidacloprid and an increase in nosema spores in honey bee colonies.

Before anyone was talking about CCD, beekeepers in the United States were experiencing huge economic injury from pesticide misuse. In a paper titled "Environmental and Economic Costs of the Application of Pesticides Primarily in the United States," David Pimentel details the costs associated with pesticide use. Quoting from the report, "The major economic and environmental losses due to the application of pesticides in the USA were: public health, $1.1 billion year; pesticide resistance to pests, $1.5 billion; crop loss caused by pesticides $1.4 billion; bird loss due to pesticides $2.2 billion; and groundwater contamination $2.0 billion.[i]

Written before anyone had heard of CCD, the Pimentel Report looks at the costs of honey bee and wild bee poisonings and reduced pollination. Quoting from this section on bees, Pimentel notes that: "Bees are essential to the production of about one-third of US and world crops. Their benefits to U.S. agriculture are estimated to be about $40 billion year. Because most insecticides used in agriculture are toxic to bees, pesticides have a major impact on both honey bee and wild bee populations. Dan Mayer estimates that 20% of all honey bee colonies are adversely affected by pesticides. He includes that 5% are killed outright or die during winter because of pesticide exposure. Another 15% of the honey bee colonies are either seriously weakened by pesticides or suffer losses when apiculturists have to move colonies to avoid pesticide damage."

Pimentel noted that reports on estimates of loses due to the reduction in pollination caused by pesticides may be as high as $4 billion year (J Lockwood, University of Wyoming, PC, 1990). Dan Mayer's total is the more conservative number of $210 million year for pollination losses.

Pollination and pollinator health is what we are talking about here. The stakes are very high. If pollinators were to fail totally, $40 billion dollars of agricultural production would vanish. Natural eco-systems would be heavily impacted through critical reductions in fruit, nut and vegetables available as food sources. An EPA senior scientist has told our group that EPA does take the subject of pollinators very seriously. At upper level meetings this is described as "nothing less than a national security issue."

Pollinators, in particular managed honey bees which are the workhorse of American agriculture, are worth protecting. These insect pollinators are as essential to the proper functioning of agriculture as are the cross threads (warp) for holding fabric together.

There are things that we can do right now to address this problem. First and foremost we must recognize the importance of pollinators. EPA should immediately designate the honey bee as a critical indicator species. Next deficiencies in the risk management and risk assessment process needs to be addressed. Specifically we will detail a few of our most pressing concerns:

1). The present regulatory system at EPA does not fully address impacts to pollinators, particularly when it comes to systemic pesticides or other products with extended residuals. A good example is with the product Clothianidin. This insecticide was released for use on many crops several years before higher tier

field testing was completed. Even when these studies were completed, they were done on a minor crop (canola at roughly 1 million acres) while a primary use of Clothianidin on corn (90 million acres) was ignored. This difference in crop is very significant to pollinators since canola is primarily a nectar source with little pollen and corn produces only pollen and no nectar. The role of pollen in the hive is different than nectar: it is the protein source for bees in their developmental stages. The other concern with pollen is that several toxins chemically bind better to fats in pollen than to the sugars in nectar. Pollen can be stored for several months and then accessed in early spring. A recent article in our bee industry magazine, *Bee Culture,* details some beekeepers concerns with the regulatory process in protecting honey bees. Copies of this article are at the back of the room for you to read.

2). Another concern is the common practice of "tank mixing" of pesticides, insecticides, fungicides, and herbicides labeled for use individually are mixed together to form something quite different. EPA currently has no provision to test these mixes for safety to pollinators. Product formulations include inert ingredients, many of which are not listed on the label, many of these "inert ingredients are toxic in and of themselves to honeybees.

3). Surfactants and crop oils are routinely added to the mix, these as well are capable of "boosting " product efficacy.

4). Chemical application is difficult to track. In many states chemical application records are private/non public documents. I, as a beekeeper, cannot get pesticide application records for insecticides applied around my bees in the State of Minnesota.

5). Newly developed methods of insecticide application, such as seed treating, have resulted in honey bee mortality. In one incident this spring at Purdue University, bees were killed and pollen contaminated with the chemicals Atrazine and Clothianidin during corn planting. EPA alleges that this is from fugitive dust blown off the treated corn seeds. If this were so, why the detection of Atrazine? Is it possible that the soil itself has accumulated toxic levels of Clothianidin from successive applications? An article prepared for the Indiana State Beekeepers magazine is also available at the back of the room.

6). When beekeepers file complaints of pesticide injury, enforcement actions often are not recorded by state regulatory officials. Information of the incident is not required to be reported to U.S. EPA.

7). Toxicology research is another concern. Penn State is a rarity in this country today. Their pollinator team includes an experienced, fully certified honey bee toxicologist, Chris Mullin.

8). U.S. EPA has no experienced honey bee toxicologist. In fact, the upcoming Pellston SETAC conference doesn't include one experienced honey bee toxicologist from EPA. This is a critical deficiency that we hope EPA recognizes and corrects soon.

9). USDA Agricultural Research Service has four bee labs; none of them has a honey bee toxicologist on staff. This deficiency has hindered USDA research with pesticides for years. We hope USDA recognizes and corrects this deficiency soon.

10). Chemical toxicity research in the United States is done primarily by the chemical registrants. The honey bee toxicity data is then shown to EPA as part of the registration process. What happens to these studies next is that they are sequestered at EPA and company files as proprietary data. By definition the end product is not science. To be considered science, a body of knowledge must stand up to repeated testing by independent scientists.

Heads buried in the sand will not discover the answers we need. We need to look at pesticides and honey bees in the full light of day and utilize good science together to make informed appropriate decisions.

CLOSING

In our March 17, 2009 public comment on Imidacloprid, we cautioned that "the problems facing EPA regarding pesticide regulation will not go away with the banning of one compound, we tried that with DDT. Instead the very regulatory system itself needs reforming. That will be a big job. Doing nothing about our ongoing pollinator crisis is not an option.

The fundamental change which is needed is to return to a system at EPA which independently tests chemical compounds before they are released for widespread use. Precaution and prevention are words which need to return to environmental protection. Massive field experiments, such as what has occurred with the neonicotinoid class of systemic insecticides is just too risky. Our current pollinator crisis is an environmental warning. We must take action before it is too late."

We thank all of you for your efforts. We look forward to working together to ensure the health and sustainability of our pollinators.

---

[i] Pimentel, David. "Environmental and Economic Costs of the Application of Pesticides Primarily in the United States." *Environment, Development and Sustainability* (2005) 7:229-252 DOI:10,1007/s10668-005-7314-2