

**HEARING TO REVIEW CURRENT RESEARCH
AND APPLICATION OF MANAGEMENT
STRATEGIES TO CONTROL PESTS AND
DISEASES OF POLLINATORS**

HEARING

BEFORE THE

SUBCOMMITTEE ON HORTICULTURE, RESEARCH,
BIOTECHNOLOGY, AND FOREIGN AGRICULTURE

OF THE

**COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES**

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**HEARING TO REVIEW CURRENT RESEARCH
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DISEASES OF POLLINATORS**

TUESDAY, APRIL 29, 2014

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON HORTICULTURE, RESEARCH,
BIOTECHNOLOGY, AND FOREIGN AGRICULTURE,
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The Subcommittee met, pursuant to call, at 10:01 a.m., in Room 1300 of the Longworth House Office Building, Hon. Austin Scott [Chairman of the Subcommittee] presiding.

Members present: Representatives Scott, Hartzler, Denham, LaMalfa, Davis, Collins, Schrader, DelBene, Costa, Vargas, and Peterson (*ex officio*).

Staff present: DaNita Murray, Debbie Smith, John Goldberg, Nicole Scott, Tamara Hinton, C. Clark Ogilvie, Keith Jones, Liz Friedlander, John Konya, and Riley Pagett.

**OPENING STATEMENT OF HON. AUSTIN SCOTT, A
REPRESENTATIVE IN CONGRESS FROM GEORGIA**

The CHAIRMAN. Good morning. This hearing of the Subcommittee on Horticulture, Research, Biotechnology, and Foreign Agriculture to review current research and application of management strategies to control pests and diseases of pollinators, will come to order.

I thank you all for being here today to discuss an issue that is extremely important to our country's agricultural industry. Today's hearing of the Subcommittee on Horticulture, Research, Biotechnology, and Foreign Agriculture will review the current health of our nation's bee pollinators. Bees play a critical role in plant reproduction, contributing an estimated \$16 billion annually in added value to more than 30 percent of the crops that we produce in this country. My colleagues and I are pleased to welcome several witnesses who have direct involvement and first-hand experience with bee pollinators. Over the past several years, beekeepers have experienced significant losses due to colony collapse. The precise reason for this Colony Collapse Disorder is not yet known. However, a leading cause appears to be the *Varroa* mite pests. Some believe other factors including disease, diet, nutrition, genetics, habitat loss, beekeeping management practices and the improper use of pesticides may also play a role.

To address these issues, the Agriculture Committee authorized increased funding for pollinator research as part of the 2008 Farm Bill. Similarly, the 2014 Farm Bill reauthorized and expanded many of these provisions addressing managing honeybees and native pollinators as part of the research, conservation and specialty crop program.

As we hear from our distinguished panel of witnesses today, we hope to gain a better understanding of the role of our nation's pollinators and the status of research both on causes of Colony Collapse Disorder and the possible tools to combat this problem.

Before us today is a panel of four distinguished witnesses. We are joined by Dr. Jeff Pettis, Research Leader of the USDA-ARS Bee Research Laboratory. Dr. Pettis oversees all USDA research concerning threats that may play into the sharp decline of our nation's pollinators. We are also joined by Mr. Dan Cummings, CEO of Capay Farms. Did I say that correctly, Mr. Cummings?

Mr. CUMMINGS. Capay.

The CHAIRMAN. Capay Farms in Chico, California. Capay Farms manages over 10,000 acres of almonds and walnuts in the Central Valley of California, also is partner and CFO of Olivarez Honey Bees.

Mr. CUMMINGS. Olivarez.

The CHAIRMAN. Olivarez. That may be the Georgia-California divide there. Every year he ensures California is provided with a healthy supply of honeybees.

Also we have Mr. Jeff Stone, Executive Director and CEO of the Oregon Association of Nurseries. The Oregon Association of Nurseries represents more than 1,200 growers, retailers, landscapers and suppliers in the ornamental horticultural industry. We have Dr. David Fischer, Director of Pollinator Safety Group and Manager of the Bayer North America Bee Center located in the Research Triangle of North Carolina. Dr. Fischer's expertise is in the area of terrestrial exotoxicology and risk assessment.

We appreciate the time each of you have given to us, and we will have a more detailed introduction of you as we go forward.

[The prepared statement of Mr. Scott follows:]

PREPARED STATEMENT OF HON. AUSTIN SCOTT, A REPRESENTATIVE IN CONGRESS
FROM GEORGIA

Good afternoon.

Thank you all for being here today to discuss an issue that is extremely important to our country's agriculture industry.

Today's hearing of the Subcommittee on Horticulture, Research, Biotechnology, and Foreign Agriculture will review the current health of our nation's bee pollinators. Bees play a critical role in plant reproduction contributing an estimated \$16 billion annually in added value to more than 30% of the crops we produce.

My colleagues and I are pleased to welcome several witnesses who have direct involvement and first-hand experience with bee pollinators.

Over the past several years, beekeepers have experienced significant losses due to colony collapse. The precise reason for this Colony Collapse Disorder is not yet known, however, a leading cause appears to be the *Varroa* mite pest. Some believe other factors including disease, diet and nutrition, genetics, habitat loss, beekeeping management practices and the improper use of pesticides may also play a role.

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We are joined by Dr. Jeff Pettis, Research Leader of the USDA-ARS Bee Research Laboratory. Dr. Pettis oversees all USDA research concerning threats that may play into the sharp decline of our nation's pollinators.

We're also joined by Mr. Dan Cummings, CEO of Capay Farms in Chico, California. Capay Farms manages over 10,000 acres of almonds and walnuts in the Central Valley of California. Also, as partner and CFO of Olivarez Honey Bees, every year, he ensures California is provided with a healthy supply of honeybees.

Also, we have Mr. Jeff Stone, Executive Director and CEO of the Oregon Association of Nurseries. The Oregon Association of Nurseries represents more than 1,200 growers, retailers, landscapers, and suppliers in the ornamental horticulture industry.

Finally, we have Dr. David Fischer, Director of Pollinator Safety Group and Manager of the Bayer North American Bee Care Center located in the Research Triangle region of North Carolina. Dr. Fischer's expertise is in the area of terrestrial exotoxicology and risk assessment.

We appreciate the time each of you have given to prepare for this hearing. Your testimony will be important to evaluate the current state of pollinator health.

Thank you.

I would like to recognize my colleague from Oregon, Ranking Member Schrader, for any opening remarks he may have.

The CHAIRMAN. I would now like to recognize my colleague from Oregon, the Ranking Member, Mr. Kurt Schrader, for any opening remarks that he may have.

OPENING STATEMENT OF HON. KURT SCHRADER, A REPRESENTATIVE IN CONGRESS FROM OREGON

Mr. SCHRADER. Thank you, Mr. Chairman. I really appreciate the opportunity to have this hearing. As we all know, honeybees are critical to agriculture. Without them, we don't have much of the agricultural products that we know and love and create a lot of economic opportunity for our country.

Honeybee populations suffered over a 30 percent decline over the past 20 years. The Colony Collapse Disorder (CCD) has been a longstanding area of research. Honeybees pollinate over 90 different food, fiber and seed crops across the country, a \$15 billion annual benefit. It covers the gamut of crops as we know. There are over two million colonies transferred all over the country to pollinate our crops by commercial beekeepers.

I have some of that experience myself, personally. Our family had a small apiary we used on our farm along with some commercial beekeepers who would help us pollinate our crops.

The losses became acute as I understand it back in 2006-2007 winter, and beekeepers have been struggling ever since. The 2008 Farm Bill for the first time funded research into what some of the causes of CCD are. We furthered that initiative in the 2014 Farm Bill, to carry that research through 2018.

As a veterinarian, I learned that diseases, whether they are in animals or in our crops, are multi-faceted. Rarely is there a single cause, I believe that is what I am hearing from folks in the industry and the folks that benefit from pollination is that we are having to deal with several different causes and figure out how best to manage what to do with the problem. The press sometimes will focus on one reason, oftentimes there is more than one cause. I hope

this hearing adds some thoughtful science to the process and moves us further down the road to good policy.

And with that, I yield back Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Schrader. And as I said before, today we have a panel of four distinguished witnesses. Dr. Jeff Pettis is Research Leader of the USDA, the ARS Bee Research Laboratory. I would now like to yield to Mr. LaMalfa for an introduction of Mr. Cummings who is from his district.

Mr. LAMALFA. Thank you, Mr. Chairman. I am glad today to have Mr. Cummings from northern California, a constituent of mine here. Dan is the Capay Farms which is responsible for managing over 10,000 acres of almonds and walnuts, also the CFO of Olivarez Honey Bees, one of the world's largest producers of queen bees for resale. He is a frequent speaker at national honeybee conventions, almond industry research conferences and international trade shows. His 30+ years of experience have prepared him as a provider of background information and frequently quoted authority on almonds, honeybees in numerous publications and media, including *The Wall Street Journal*, *Fortune* magazine, *Newsweek*, and the BBC.

Dan is also a director on the Blue Diamond Growers who have very graciously provided us with snacks here today. And it has helped me to illustrate that we say almond without the "1" in California a lot.

So he is on the Blue Diamond Growers as a Director and Immediate Past Chairman of Project Apis m. and the Chairman of the Bee Task Force of the Almond Board of California. Dan has traveled extensively, having visited over 50 countries around the world, often promoting almonds during his tenure as Vice Chairman of the Almond Board and Chairman of that organization's Marketing Committee.

He holds a BA in Economics from Stanford University, an MBA from Harvard and has been an instructor of the Capstone Course on Competition and Strategy in the College of Business at California State University in Chico.

Dan, thank you for appearing today. Mr. Chairman, I yield back.

The CHAIRMAN. I would like to now recognize Mr. Schrader, again, for an introduction of Mr. Stone from Oregon.

Mr. SCHRADER. I will make it brief, Mr. Chairman. I am just really pleased to have Mr. Stone here. Jeff is no stranger to Capitol Hill and the goings on, so he brings a wealth of knowledge about the process. He has been the Executive Director of the Oregon Association of Nurseries for a number of years now and has great reputation back home. He is one of the leaders in our agricultural community when it comes to solving problems that affect all agriculture, and I really want to welcome him here. I appreciate him coming.

The CHAIRMAN. And again, we have Dr. David Fischer with Pollinator Safety and Manager for Bayer North American Bee Care Center from North Carolina. Gentlemen? Dr. Pettis, your opening statements.

**STATEMENT OF DR. JEFFREY S. PETTIS, RESEARCH LEADER,
BEE RESEARCH LABORATORY, AGRICULTURAL RESEARCH
SERVICE, U.S. DEPARTMENT OF AGRICULTURE,
BELTSVILLE, MD**

Dr. PETTIS. Chairman Scott, Ranking Member Schrader, and Members of the Subcommittee, I am Dr. Jeff Pettis, Research Leader of the Bee Research Laboratory in Beltsville, Maryland, a research laboratory dedicated to honeybee health. I am pleased to appear before you today to discuss a serious threat to the honeybee, the parasitic mite, *Varroa*, and also pollinator decline, an issue that threatens U.S. food security.

About $\frac{1}{3}$ of our diet directly or indirectly benefits from honeybee pollination, and these tend to be the foods that add flavor and diversity to our diet, the fruits, nuts and vegetables that we enjoy. We can survive on grains, like corn, rice and wheat, but we thrive on the fruits, nuts and vegetables that bees provide.

I want to focus my remarks now on one specific threat to honeybees, the parasitic mite *Varroa*, a modern plague on honeybees and responsible for the deaths of massive numbers of colonies not only here in the United States but worldwide.

When *Varroa* mite was first found in this country in 1987, we had a strong population of honeybees in the wild. Beekeepers managed more than three million colonies for crop pollination, and their winter losses were typically around 10 to 15 percent. Today wild populations of bees are virtually gone. We manage 2.5 to 2.7 million colonies, and the economic losses and the sustainability of beekeeping is at a tipping point. Ultimately, if no solutions are found for the *Varroa* mite and other plagues on honeybees, our food could become more expensive.

Varroa mites are like ticks. They suck the blood of the bee physically and are a huge parasite in relation to the size of the honeybee. To illustrate this, if a honeybee were the size of a person, it would be like you having a tick the size of this large navel orange feeding on you. So again, if you can imagine that size parasite on an average human, you can see the *Varroa* mite is in fact a very physically damaging parasite and in addition, it acts much like a mosquito and will transmit viruses and other diseases that affect the bee.

What bees and beekeepers need is research to build better tools to truly reduce the size of the problem the *Varroa* represents. Researchers at USDA's scientific agencies, the Agricultural Research Service and the National Institute of Food and Agriculture are working short term to provide better management practices and getting that information out to the beekeepers. For long-term solutions, we are looking at the genetics of both the mite and the bee, and we are also looking at better ways of nationally monitoring the bee health around the country.

To give you an idea of how seriously the critical need for new solutions is, this past February USDA hosted a *Varroa* Summit. We brought together more than 75 individuals representing a broad array of stakeholders, and they talked for 2 days and they came up with a number of long-term and short-term solutions. We have a report coming out from that which will help guide us in future research on *Varroa*.

However, even if the *Varroa* mite problem disappeared tomorrow, and I want to emphasize that, even if the *Varroa* mite problem disappeared tomorrow, honeybee health is complicated. This would not by itself solve all the problems facing honeybees. In the last 20 years, a whole host of new honeybee pathogens, viruses, bacteria, fungi, mites, have entered the United States, and Colony Collapse Disorder, a syndrome for which scientists still do not have a cause, while it has abated, continues to take a toll on apiaries. Exposure to pesticides in the environment may be weakening bee colonies, possibly making them more susceptible to other stresses. A lack of diversity in nectar and pollen resources may also play a major role in stressing honeybee colonies in the environment. Last, a loss of honeybees may reflect a larger issue of pollinator decline, with honeybee acting as an indicator species. The relative contributions of different stressors to colony deaths, including Colony Collapse Disorder, is not well understood, and solving this problem will take an all-hands-on-deck approach, including research, public education, increased foraging lands and public-private partnerships to address the loss of pollinators.

To meet today's increasing pollination demands, we need well over three million managed honeybee colonies in this country. To meet that goal, we need to make beekeeping profitable again, and I believe that starts with limiting the impact of *Varroa*, but it goes beyond that.

So I would like to thank you again for the opportunity to speak to you today about pollinator health and food security, and I will be glad to answer questions as time permits.

[The prepared statement of Dr. Pettis follows:]

PREPARED STATEMENT OF DR. JEFFREY S. PETTIS, RESEARCH LEADER, BEE RESEARCH LABORATORY, AGRICULTURAL RESEARCH SERVICE, U.S. DEPARTMENT OF AGRICULTURE, BELTSVILLE, MD

Chairman Scott, Ranking Member Schrader, and Members of the Subcommittee, I am Dr. Jeff Pettis, Research Leader of the Bee Research Laboratory in Beltsville, Maryland, a research laboratory dedicated to honey bee health and part of the USDA Agricultural Research Service. I am pleased to appear before you to discuss a serious threat to the honey bee and thus our food security in the United States.

Ultimately, if no long-term solutions are developed to slow bee decline, consumers will pay more for the food they buy. About one bite in three of the food we eat in the U.S. directly or indirectly benefits from bee pollination. These tend to be the foods that add vital nutrients, flavor and diversity to our diet: the fruits, nuts and vegetables that maintain health. Bees pollinate more than 90 crops and are responsible for \$15 billion in added crop value. Over half the nation's bees are needed to pollinate almonds alone, a \$3 billion crop with increasing acreage.

One of the biggest problems facing honey bees and beekeepers today is the *Varroa* mite. The *Varroa* mite's full name is *Varroa destructor*, and it is perhaps the most aptly named parasite ever to enter this country. *Varroa destructor* is a modern honey bee plague. It has been responsible for the deaths of massive numbers of colonies both within the United States and worldwide. This mite is native to Asia where it normally parasitizes *Apis cerana*, the eastern or Asian honey bee, an entirely different species of honey bee from *Apis mellifera*, or the western honey bee, that was brought to the New World by Europeans, and on which the U.S. now depends for crop pollination. Asian honey bees have some natural defenses against the mite and consequently are rarely seriously affected by the *Varroa*. European honey bees, on the other hand, have been devastatingly susceptible to *Varroa* mite damage. The simple act of feeding by *Varroa*, where it pierces the skin of the bee to suck blood, can introduce bacteria and weaken the immune system of bees. *Varroa* mites also transmit an array of destructive viruses to honey bees, such as deformed wing virus.

When *Varroa destructor* was first found in the United States in 1987, beekeepers managed more than three million colonies for crop pollination and their winter

losses were typically about 10 to 15 percent. Today, beekeepers are having trouble maintaining 2.5 million managed colonies, winter losses are averaging over 30 percent a year, and the economic sustainability of beekeeping is at the tipping point. Beekeepers have identified *Varroa* mites as a major problem. The costs of mite controls and replacing hives that only live 1–2 years, as opposed to living 3–5 years before the arrival of *Varroa*, are all accumulating to the point where *Varroa* mites are making beekeeping no longer financially viable in this country.

For commercial beekeepers, there are currently only three fast-acting treatments for *Varroa* mites: the miticides fluvalinate, coumaphos, and amitraz. While there are also a number of folk remedies and organic treatments, none work as well as these other treatments and all involve more labor and costs to apply. However, *Varroa* mites are adapting and becoming resistant to fluvalinate and coumaphos. Some new treatments are in the pipeline but even a new effective miticide will only provide a short-term solution because it is only a matter of time before the *Varroa* mite will adapt to that miticide as well, continuing the destructive cycle. What beekeepers truly need are long term solutions to *Varroa* mites.

The beekeeper's best hope is research that can build better tools to reduce the size of the *Varroa* mite problem. Researchers at USDA's scientific agencies—the Agricultural Research Service (ARS) and the National Institute of Food and Agriculture (NIFA) are on that trail right now. In ARS, scientists are working with a total budget of approximately \$11 million in FY 2014, with approximately \$3 million targeting *Varroa* specifically. Additional temporary funding of \$1.3 million in 2013 has been provided on bee health through the Areawide Program of ARS. These funds have helped augment the base funds and allow scientists to work closely with commercial beekeepers to try and improve colony survival.

ARS scientists are developing improved best management practices to help beekeepers deal with immediate issues of overcoming *Varroa* mites. By applying microbiological, genomic, physiological, and toxicological approaches, we are creating new tools for beekeepers to build and maintain healthy bee populations. For long-term solutions, ARS is looking to the genetics of both the mite and the honey bee. ARS has an active breeding program designed to increase resistance mechanisms in European honey bees. For example, some bees have a propensity for nest cleaning and grooming behaviors and these have been exploited in breeding programs as control measures. ARS is also working on improving epidemiological nation-wide monitoring of pest and diseases, biochemical disruption and a host of other possibilities.

NIFA is supporting extramural research, extension, and educational programming to scientists, extension specialists and educators to address declines in pollinators. Dozens of competitive and capacity grants are focused on novel strategies to manage the *Varroa* mite, which are expected to better protect pollinators from this devastating pest. Since 2010, NIFA has awarded competitive grants on pollinator health worth an estimated \$13 million, including approximately \$2.6 million targeting *Varroa* specifically. *Varroa* does not act alone on bee health and thus many of these projects take a holistic approach, looking into the multiple factors affecting honey bees and other pollinators. In one NIFA funded project, University of Minnesota extension specialists are assisting honey bee queen breeders in selecting for hygienic behavior, a trait that helps bees defend against *Varroa* mites and other diseases. In another, Cornell scientists are testing the hypothesis that giving colonies smaller hives will provide the mites fewer opportunities to reproduce and this will lower the per capita level of mite infestation of the bees.

The work at USDA is part of a government-wide response to the large and ongoing declines in pollinator populations in the U.S. and world-wide. The President's FY 2015 budget proposes over \$71 million for USDA alone to focus on this issue. This includes a \$25 million initiative to create an Innovation Institute on Pollination and Pollinator Health, a competitive program that will be managed by NIFA.

As a measure of the seriousness with which the *Varroa* issue is regarded, USDA hosted a *Varroa* Summit in February of this year. More than 75 representatives and researchers from beekeeping organizations, agricultural commodity groups, the crop protection industry, universities and Federal agencies such as APHIS, ARS, NIFA, NRCS and EPA attended to discuss research needed to solve the problem of *Varroa* mites. The attendees identified numerous specific short-term and long-term research priorities. Most of these concerned the need to develop the underpinnings for new approaches to controlling *Varroa* mites: finding natural biocontrol agents, developing RNA interference as a control measure, developing areawide management practices and improving best management practices, and identifying genetic markers and breeding for bee traits that will provide *Varroa* survivability. Attendees also recognized the need for more extensive communication between researchers and beekeepers for collection of epidemiological and economic *Varroa* mite data and for transmitting new information from researchers on techniques for controlling *Varroa*.

One potential outcome of the *Varroa* Summit will be an increased level of collaboration between scientists and more public-private and Federal-university partnerships.

But even if the *Varroa* mite problem were solved today, this would not by itself solve all of the problems facing honey bees and beekeepers. In the last 20 years, a whole host of new honey bee pathogens—viruses, bacteria, fungi, mites—have entered the United States. We know that the effects of viruses in particular are significantly exacerbated when coupled with the presence of *Varroa*. Colony Collapse Disorder, a syndrome for which scientists still do not have a cause, continues to take a toll on apiaries. Exposure to pesticides in the environment may be weakening bee colonies, possibly making them more susceptible to other stresses. A lack of diversity in nectar and pollen sources may also play a major role in stressing honey bee colonies. The loss of honey bees may also reflect a much larger issue of general pollinator declines, with honey bees acting as an indicator species. The relative contributions of different stressors for CCD is not well understood and solving this problem will take an all hands on deck approach, including research, public education, increased foraging lands and public-private partnerships to address CCD and the larger loss of pollinators.

To meet today's increasing pollination demands, we need well over three million managed honey bee colonies in this country. To do that, we need to make beekeeping profitable again and that starts with controlling *Varroa destructor*.

Mr. Chairman, I look forward to working with you in support of honey bees and pollinator health, a vital link in U.S. food security. Thank you again for your time. I would be pleased to answer any questions you have on *Varroa* mites and pollinator health.

The CHAIRMAN. Thank you, doctor. Mr. Cummings?

STATEMENT OF ARTHUR DANIEL "DAN" CUMMINGS, CHIEF EXECUTIVE OFFICER, CAPAY FARMS; CHIEF FINANCIAL OFFICER, OLIVAREZ HONEY BEES, CHICO, CA

Mr. CUMMINGS. Good morning, Mr. Chairman and Members of the Committee. Thank you for inviting me to testify this morning on the importance of honeybee health to the United States' almond industry. My name is Dan Cummings. I am the CEO of Capay Farms where I produce almonds and walnuts. Additionally, I am the Chairman of the Almond Board of California Bee Task Force and have served as Vice Chairman of that board. My almonds are delivered to Blue Diamond Growers on whose board I serve. Blue Diamond is a nonprofit, farmer-owned marketing cooperative.

Almonds are grown exclusively in California and are the largest tree crop in California with a value of \$6 billion. Over \$4 billion of almonds were exported to the world last year. Over 80 percent of the world's almond supply is produced in California.

The honeybee is essential for the global food supply. One third of our diet comes from honeybee-pollinated plants. The continuing health of the honeybee population is a matter of concern to the global agricultural community. Managed honeybees are vital to more than 90 bee pollinated crops in the United States, and nearly \$20 billion in farm income is dependent on honeybees. California almond growers depend on honeybees for their livelihood. Approximately 1.6 million colonies, approximately $\frac{2}{3}$ of all the commercially kept honeybees in the United States, are needed to pollinate California's almond orchards.

California almonds are the first and largest crop each spring to require honeybees for pollination. Our industry partners with beekeepers with whom we share the common goal of healthy honeybees to support the future growth of almond production. The two industries are inextricably linked. Almond pollination has become a primary economic driver of the honeybee industry. It may sur-

prise you to learn that almond pollination fees to beekeepers nearly equal the value of all commercially produced and sold honey in the United States.

The Almond Board has invested \$2.3 million in honeybee health research. As a grower-owned cooperative, Blue Diamond Growers is the largest single contributor to the Almond Board. Project Apis m. has further invested over \$2.2 million on behalf of honeybees. The Almond Board created a Bee Task Force whose members include almond growers and processors, beekeepers and researchers. The purpose of this group is to make recommendations for research and effective pollination practices.

Fifty-one percent of almond farms are less than 50 acres, and over 80 percent of almond farms are owned and operated by families. Almonds are the earliest blooming natural food source for honeybees. Honeybees found in almond orchards enjoy an abundance of natural forage. As a result, hives typically increase after almond pollination and bloom.

Because the almond industry recognizes the essential role honeybees play in sustaining the global food supply, it and Project Apis m. have together invested approximately \$4.5 million in honeybee research. This is more money than any other U.S. commodity has invested in honeybee research. The focus of this research is on improving the health of hives, which includes improving honeybee nutrition, managing pests and diseases effectively, restoring honeybee genetic stock diversity, helping honeybees cope with parasites and disease, and other areas related to help improve their health and longevity.

Our research has led to several breakthroughs in maintaining honeybee health. The focus has been on ensuring better honeybee nutrition and the overall improvement of hive health. Research has also resulted in establishing best practices for dealing with the *Varroa* mite. This is a pest that emerged in the mid-1980s that attacks beehives by weakening and shortening the lifespan of honeybees on which they feed. Initial feedback from beekeepers has been that those who have adopted newer bee management practices experience improved honeybee hive health and performance. Our industry is also part of an alliance that created a farming guide to promote reduced risk and environmentally responsible pest management practices. The health of the honeybee is a top priority in the best management practices. These guidelines are shared with all growers.

Several promising new bee research programs funded by the almond industry are under way. Dedicated research to improve honeybee genetic stock has resulted in breeding programs for hygienic behavior to help control diseases like the *Varroa* mite.

Another project extends best practices to queen honeybee breeders to assure honeybee health and genetic diversity.

The almond industry was instrumental in the development of MegaBee, a new nutritional supplement for honeybees. California almond growers will continue to lead in the investment in honeybee research, including honeybee nutrition, improved honeybee genetics, the effective management of pests and diseases and the impact of pesticides.

Thank you, Mr. Chairman for holding this important hearing on this very critical subject. I will be happy answer any questions you may have.

[The prepared statement of Mr. Cummings follows:]

PREPARED STATEMENT OF ARTHUR DANIEL "DAN" CUMMINGS, CHIEF EXECUTIVE OFFICER, CAPAY FARMS; CHIEF FINANCIAL OFFICER, OLIVAREZ HONEY BEES, CHICO, CA

The Importance of Honeybee Health to the U.S. Almond Industry

Good morning, Mr. Chairman and Members of the Committee. Thank you for inviting me to testify this morning on this very important subject.

My name is Dan Cummings. I am the CEO of Capay Farms in Hamilton, California, where I produce almonds and walnuts. Additionally, I am the Chairman of the Almond Board of California Bee Task Force and have served as Vice Chairman of that Board. The Almond Board of California is a Federal Marketing Order administered by the Department of Agriculture. Also, I am the Chairman Emeritus of *Project Apis m.*

My almonds are delivered to Blue Diamond Growers on whose Board I serve. Blue Diamond Growers is a nonprofit farmer-owned marketing cooperative. Blue Diamond Growers is the world's largest processor and marketer of almonds, founded in 1910 and headquartered in Sacramento, California. The company obtains its supply of almonds from its member/owners and sells them to retail chains and food processing, confectionery and food service companies in nearly 100 nations around the world. Almonds are grown exclusively in California and are the largest tree crop in California with a value of \$6 billion. In fact, over \$4 billion of almonds were exported from California to the world last year alone. Almonds are California's number one agricultural export.

Nationally almonds rank in the top three consumer food items exported from the United States. Blue Diamond Growers exports for the majority of the almond growers in the State of California. Almond production continues to expand in order to supply the world. Over 80% of the world's almond supply is produced in California. Almonds are primarily grown in central California in a 400 mile area from Red Bluff, in the north, to Bakersfield, in the south.

The Honeybee is Essential for the Global Food Supply

The honeybee is essential for the global food supply. One-third of our diet comes from honeybee-pollinated plants. The continuing health of the honeybee population is a matter of concern to the global agricultural community. Managed honeybees are vital to more than 90 bee-pollinated crops in the United States.

Nearly \$20 billion in farm income is dependent on honeybees, directly or indirectly. Honeybee-pollinated crops include almonds, apples, cherries, melons, pumpkins, squash and sunflowers. Honeybee-pollinated seeds are also critical to cattle and livestock that ultimately feed on alfalfa.

California almond growers depend on honeybees for their livelihood. We are very concerned about the health of honeybees. Approximately 1.6 million honeybee colonies—approximately $\frac{2}{3}$ of all the commercially kept honeybees in the United States—are needed to pollinate California's almond orchards. An almond crop depends on cross-pollination. Most almond orchards have at least two compatible varieties of almonds planted. The honeybees cross-pollinate between these varieties in order to establish the crop. Without honeybees, there would be no crop.

California almonds are the first and largest crop each spring to require honeybees for pollination. Our industry partners with beekeepers with whom we share the common goal of healthy honeybees to support the future growth of almond production and other agricultural products. California almond growers are significant contributors to *Project Apis m.*, a nonprofit organization that brings together representatives from the pollination and crop production industries to support research aimed at improving the beekeeping industry. I was the Chairman of the Board of *Project Apis m.* during its first 6 years and remain a Board member.

Blue Diamond Growers will contribute \$100,000 to *Project Apis m.* this year for research dedicated to healthier honeybees. This is in conjunction with Blue Diamond Growers' introduction of several new honey almond products.

The Almond Board of California has funded honeybee research beginning in 1976. Since 1995, it has invested \$2.3 million in honeybee health research. As a grower-owned cooperative, Blue Diamond Growers is the largest single contributor to the Almond Board of California. *Project Apis m.* has invested over \$2.2 million on behalf of honeybees.

The Almond Board of California created a Bee Task Force in 2005 whose members include almond growers and processors, beekeepers and researchers. The purpose of this group is to make recommendations for research and effective pollination practices. This is being done to ensure a future of strong healthy hives in sufficient numbers. I was the first grower to chair this committee and still do.

Together, the Almond Board of California is partnering with the California State Beekeepers Association and *Project Apis m.* that works with landowners and managers to grow “bee pastures” during the pollen deficient winters. This project is funded through a series of grants.

Fifty-one percent of almond farms are less than 50 acres and over 80% of almond farms are owned and operated by families either individually or in partnership. Almonds are the earliest blooming natural food source for honeybees after wintering on supplements. Honeybees found in California’s almond orchards enjoy an abundance of natural forage. As a result, hives typically increase after almond pollination and bloom. These larger hives are then “split” into smaller units by beekeepers. It is best to ensure honeybees have a diverse, season-long chain of food sources.

The Almond Board of California is also participating in a USDA grant for advancing “Integrated Crop Pollination.” This approach integrates honeybees, other managed pollinators like the Blue Orchard Bee, and “bee pasture” in addition to almonds.

Because the California almond industry recognizes the essential role honeybees play in sustaining the global food supply, it and *Project Apis m.* have invested approximately \$4.5 million in honeybee research. This is more money than any other U.S. commodity has invested in honeybee research. Other industry organizations have invested additional funds in honeybee research. The focus of this research is on improving the health of hives, which includes improving honeybee nutrition, managing pests and diseases effectively, restoring honeybee genetic stock diversity, helping honeybees cope with parasites and disease, and other areas related to helping improve their health and longevity.

Our research has led to several breakthroughs in maintaining honeybee health. Experts agree that beekeeping practices in the U.S. have changed more in the last few years than in the last 20 years. The focus has been on ensuring better honeybee nutrition and the overall improvement of hive health. Honeybees need a variety of food sources in their diet for optimum health. The Almond Board of California’s support was instrumental in the development of a new nutritional supplement for honeybees that beekeepers can use in the late summer and fall when natural sources of pollen are at low levels.

Research has also resulted in establishing best practices for dealing with the *Varroa* mite. This is a pest that emerged in the mid-1980s that attacks beehives by weakening and shortening the life span of the honeybees on which they feed. Initial feedback from beekeepers has been that those who have adopted these newer bee management practices experience improved honeybee hive health and performance.

Our industry is also part of an alliance that created a farming guide to promote reduced-risk and environmentally responsible pest management practices based on over 5 years of field data and experience in almond orchards. The health of the honeybee is a top priority in the Best Management Practices. These guidelines are shared with all growers and include recommendations to avoid applications of insecticides during bloom; and to minimize exposure by honeybees to any spray by avoiding applications when pollen is available and honeybees are feeding.

Several promising new bee research programs funded by the almond industry are underway. Over the years, dedicated research to improve honeybee genetic stock has resulted in breeding honeybees for hygienic behavior to help control diseases like the *Varroa* mite, which is the most serious pest of honeybees. Current research by Dr. Walter Sheppard and Sue Cobey at Washington State University is aimed at restoring genetic diversity to commercial honeybee stock. By increasing the gene pool within breeding stock, honeybees will be better able to cope with parasites and pathogens. This project has also developed safe collection and preservation techniques for honeybee stock and genetic material.

Another project extends best practices to queen honeybee breeders to assure honeybee health and genetic diversity. Dr. Marla Spivak at the University of Minnesota leads this research. It has increased the proportion of improved stock in commercial breeding lines. It has also implemented diagnostic and integrated pest management (IPM) programs resulting in better control of bee hive pests with fewer chemicals.

A third research project being conducted by Dr. Louisa Hooven at Oregon State University builds on past research assessing the impact of fungicides on honeybees. This work is evaluating the impact of four fungicides currently used in almonds on honeybee development.

The almond industry is the largest single contributor to increasing the health of honeybees in America. It is instrumental in the development of MegaBee, a new nutritional supplement for honeybees, which can be used in the late summer and fall when natural sources of pollen are at low ebb. It has helped establish later summer-fall feeding practices that are important for strong hives. It developed integrated pest management (IPM) approaches for *Varroa* mite control that use fewer chemicals in the hive and new breeding techniques for improved honeybee resistance to pests and pathogens.

In fact, beekeepers who have adopted these newer honeybee management practices experience improved honeybee hive health and performance. For example, Dr. Frank Eischen of ARS/USDA is conducting an ongoing study in Kern County, which indicates that hive build up during almond bloom resulted in an average of a 27% increase in hive strength. He notes, that at the beginning of almond bloom, the hive strength averaged 11 frames of honeybees and at the end of bloom; the hive strength averaged 14 frames of honeybees. Under average weather conditions, a standard size (referred to as "strength") hive of eight frames of honeybees at the start of the bloom will increase in size or "strength" to 10–12 frames at the end of the almond bloom.

This improves in warm weather conditions, like we just experienced in February 2014, where a hive of eight to ten frames of honeybees will increase to 15 to 16 frames of honeybees. This is an increase in size or "strength" ranging from 50% and up. Further research is currently being conducted on this year's bloom and its impact on the health of honeybees.

Meanwhile, California almond growers will continue to lead in the investment in honeybee research, including honeybee nutrition, improved honeybee genetics, the effective management of pests and diseases, and the impact of pesticides.

Thank you, Mr. Chairman for holding this important hearing on this very critical subject. I will be happy answer any questions you may have.

The CHAIRMAN. Thank you, Mr. Cummings. Mr. Stone?

STATEMENT OF JEFF STONE, EXECUTIVE DIRECTOR AND CHIEF EXECUTIVE OFFICER, OREGON ASSOCIATION OF NURSERIES, WILSONVILLE, OR

Mr. STONE. Chairman Scott, Ranking Member Schrader, Members of the Subcommittee, I am Jeff Stone, and I serve as the Executive Director of the Oregon Association of Nurseries. I have placed into the record my expanded testimony, and I will be mercifully brief in my comments before you this morning.

The Oregon nursery and greenhouse industry is the largest sector in agriculture. It is also the second-largest nursery state in the country with over \$744 million annually in sales. Nationally the horticulture industry's production, wholesale, retail and landscape service components represent about \$163 billion in economic activity with \$1.1 million full- and part-time jobs.

I am not going to tell you that the bee deaths that occurred in Oregon last summer was not bad. It was. A respected landscape company sprayed neonicotinoid pesticides on linden trees in flower, which are highly attractive to bees. This incident killed 50,000 bees, occurred less than a mile from my home office in Wilsonville on National Pollinator Day. I couldn't think of a worse set of circumstances.

While I am not a nursery grower, I work for them and I don't even pretend to have the understanding about how to grow clean, quality plants, but I do know how to read. And I reviewed the label with the agricultural agency about the pesticide application. It was done improperly and against what the EPA label says. And that is the law.

The Oregon Department of Agriculture began an investigation and instituted a temporary ban of the use of the pesticide con-

taining the active ingredient, dynotefuran. I practiced that quite a bit, actually. I didn't know how to say it. Investigation was completed and the restriction lifted at the end of 2013. At the beginning of 2014, the department imposed label language restrictions on the pesticides and dynotefuran and imidacloprid. For those trees in the *Tilia* genus, which includes linden and basswood trees.

The concerns around pesticide use and the potential effects on bees is very important to all pesticide users, especially those involved in agriculture. Oregon farmers depend on bees to pollinate many of their crops. They also depend on pesticide as tools to combat destructive pests. The furor over the death of so many bees caused national attention, but the discussion in Oregon was engaged by beekeepers, environmental groups and the farm community. Legislation was filed in the state legislature that would have moved neonicotinoids to restricted use and functionally ban the use of the product in the state. Oregon House Bill 4139 could have taken a negative approach in pitting interest group against interest group, but that did not happen. Instead, stakeholders listened to one another and determined that a science-based approach to pollinator health would lead to a better solution.

So over the next 2 years, stakeholders will roll up their sleeves and work with Oregon State University, our land-grant university, legislators and state agencies to determine the most proper path forward. And there is science out there, quite a bit, actually. But what we hear in the press are from the extremes. However, Oregon chose not to cherry-pick the science that suited a political point, instead doing the work which I urge Congress to do.

We see a lot of white papers and press releases, but let us talk about what is actually happening on the ground. For a retailer who sprays pesticides indoors, that is away from bees, at risk was the critical Christmas season plant, poinsettias, who have a common pest called the white fly. Now, nobody is going to buy let alone sell a plant that has a pest on it at your garden center. But the large garden center during this temporary ban was required to find an alternative pesticide for the whitefly and ended up using three times the amount of pesticide than they ordinarily would. Normally, it is a small drench application. So they put it right in the soil for the highly effective neonics. Instead, a less-effective pesticide was used, taking more time and making the business really consider the fact for human health because it has far more toxicity. For the operator, it is just not a matter of if alternatives are present but are they as effective and can you get by with using less?

Without a full pest management program, whiteflies will quickly develop resistance and threaten other crops including cotton in other parts of this country. A pest management plan was developed in part with the nursery industry and the cotton industry with USDA. Pest and disease problems are real, and they can cost agriculture and threaten our natural environment.

For pollinator health, there is no smoking gun. But as my written testimony explains, there are several factors for Colony Collapse Disorder. Our industry has faced many challenges, Mr. Chairman, from invasive pests and pathogens and regulatory ob-

stacles, and we are still recovering from the housing collapse that took out a third of my membership just in the past 5 years.

But Oregon growers are innovative, and we want to work through issues and engage those that may disagree with us on this very emotional issue, but we need to let science be our guide and not emotion. And it is my sincere hope that Congress engages in the same spirit. Thank you for your time and attention.

[The prepared statement of Mr. Stone follows:]

PREPARED STATEMENT OF JEFF STONE, EXECUTIVE DIRECTOR AND CHIEF EXECUTIVE OFFICER, OREGON ASSOCIATION OF NURSERIES, WILSONVILLE, OR

Chairman Scott, Ranking Member Schrader, Members of the Subcommittee, I am Jeff Stone and I serve as the Executive Director of the Oregon Association of Nurseries. I welcome the opportunity this morning to provide comments for your consideration relating to pollinator health.

This morning I will discuss the merits of a discussion on pollinator health and its importance to the agricultural community as well as our environment. I will address how Oregon's nursery and greenhouse industry uses neonicotinoids. I will also talk about the potential impacts to agriculture if this chemical class is restricted or banned without proper science-based facts. Last, I will give a little insight on how Oregon brought together stakeholders to chart out a reasoned path on this important issue.

Oregon Nursery Industry Background

The nursery and greenhouse industry is the largest agricultural sector in Oregon. Oregon represents the nation's second largest nursery state with more than \$744 million in sales annually. The industry is a traded sector, much like you would see in high technology or other cluster businesses. Nearly 75 percent of the nursery stock grown in our state leaves our borders—with more than ½ reaching markets east of the Mississippi River. Our reach extends to international markets as well. Nursery association members represent wholesale and Christmas tree growers, retailers and greenhouse operations. Nationally the horticultural industry's production, wholesale, retail, and landscape service components have annual sales of \$163 billion and sustain over 1,150,000 full and part-time jobs.

As a proud part of U.S. agriculture, we certainly understand the importance of pollinators to the agricultural industry and our natural environment. We also recognize the importance of having effective pesticides with low environmental impact. Much of the debate today will be over Neonicotinoids. This chemical class, when used properly, is vital to the success of our industry. They are important tools in defending trees, shrubs, and plants against destructive invasive species like the Japanese Beetle, Hemlock Woolly Adelgid and Asian Longhorned Beetle and employed as part of a management strategy to control chemical-resistant whitefly species.

Pollinator Health Is Critical to the Nursery and Greenhouse Industry

In the summer of 2013, a misapplication of pesticides on Linden trees in Wilsonville resulted in the death of 50,000 bees due to acute toxicity, or their direct contact with the insecticide. Oregon's Department of Agriculture (ODA) conducted an investigation and instituted a temporary rule restricting the use of pesticides containing the active ingredient dinotefuran. The investigation was completed and the restriction lifted in December 2013. Effective at the start of 2014 the department has imposed label language prohibiting the use of products containing dinotefuran and imidacloprid for use on trees in the *Tilia* genus, which include linden and basswood trees—these trees are highly attractive to pollinators when in flower.

The concerns around pesticide use and potential effects on bees are very important to all pesticide users, but especially those involved in agriculture. Oregon farmers depend on bees to pollinate many of their crops. They also depend on pesticides as tools to control destructive pests. Similarly, commercial beekeepers rely on healthy crops to optimize their pollination services. This means that Oregon growers and beekeepers have a lot at stake in this conversation. Both of us want to make sure that protecting bee health, and retaining pesticides as an effective tool, are not mutually exclusive.

The association conducted extensive outreach to our members—including retailers, greenhouse operators and wholesale growers—to increase awareness of the pollinator issue. We also wanted to assess the use of neonicotinoids and understand

the number of licensed pesticide applicators. Beyond the dramatic headlines, the nursery industry expressed its support of the ODA action and the industry's reservations regarding an outright ban of neonicotinoids. This chemical class, first developed in the 1990s, represents advancement over other chemical classes making them safer to both human and pollinators and are used as part of pest mitigation strategies by our greenhouse and nursery members. In some cases, neonicotinoids are approved regulatory treatments for certification and interstate movement of nursery and greenhouse crops.

While seven states have made efforts to pass anti-neonicotinoid legislation, it is critical that the Federal Government's efforts be science-based. Congress should listen to stakeholders from the green industry, the environment community and academia. This is what we did in Oregon and we believe it could serve as a national model to give voice to disparate views while working toward a common goal—improving pollinator health. The Environmental Protection Agency's labeling program is intended to create a unified national regulatory program that prevents patchwork lawmaking by states. One standard is critical for commerce between the states.

Science and Reason Should Go Hand in Hand

Bee health is important to all of us. Nobody wants to see adverse incidents that add to the decline of bee populations. That being said, it is easy to let emotion drive the conversation. Instead, we should let science be our guide.

Based on current science, the Environmental Protection Agency (EPA) continues to allow application of neonicotinoids with appropriate guidelines. These chemistries are among the safest available to combat many pests. We encourage Congress to direct the research community to pursue its work on this issue without bias and identify the appropriate steps to alleviate environmental and pest pressures on pollinator health.

It is important to note that neonicotinoids represent a tremendous advancement over older pesticide treatment options. When used properly, neonicotinoids effectively control problem insects, while exhibiting less impact on non-target insects (including bees). Their ability to provide residual control means fewer applications and less applicator exposure. The OAN and other nursery industry leaders fear that decisions made to restrict or prohibit use of such materials, without scientific merit, will undermine research and development into new and reduced-risk materials going forward.

These calls to ban neonicotinoids continue despite a cadre of reports that suggest their role in declining bee health is small. The USDA's 2013 report on Honey Bee Health put pesticides, in general, near the bottom of the list of factors impacting bee health. The report highlighted other issues like colony management, viruses, bacteria, poor nutrition, lack of genetic diversity, and habitat loss as more impactful. The report continued to stress that, "the single most detrimental pest of honeybees" is the parasitic *Varroa* mite, first discovered in the U.S. in 1987. Recent reports from the Australian Governments Pesticides and Veterinary Medicines Authority (equivalent to our EPA) supported the conclusions of the USDA report. The Australian report said that even though neonicotinoid pesticides are used there, Australia has not suffered from honey bee colony declines, like those seen in Europe and the U.S.

Since reports of significant losses to bee colonies were publicized in 2006, researchers and regulators have been looking for possible causes. A Colony Collapse Disorder (CCD) Steering Committee was formed at the national level to address the concerns over bee losses. Several individuals from the Steering Committee along with Pennsylvania State University met in October 2012 for a National Stakeholders Conference on Honey Bee Health to discuss future actions to promote health and mitigate risks to managed honey bees in the U.S. In May 2013 the U.S. Department of Agriculture (USDA) and EPA released a comprehensive scientific report on honey bee health. The report concludes that there are multiple factors that play a role in honey bee colony declines. Findings from the report include:

- There are multiple diseases associated with CCD, many of which are amplified by the *Varroa* mite.
- Stakeholders should adopt Best Management Practices (BMPs) to enhance bee health.
- There is need to significantly improve genetic diversity in U.S. bee populations.
- Bees require increased nutritional options (forage) to lessen susceptibility to stressors.
- There should be continued research on pesticide impacts at field-relevant exposures.

- Stakeholders need greater collaboration and information sharing among stakeholders to facilitate adoption of BMPs that are critical to improving bee health.

While the current research does not point to neonicotinoids as a primary factor in bee health decline, we know that it may be tempting to restrict use for precautionary reasons. Unfortunately this approach ignores the important role these products play in managing pests that can have devastating effects on the environment. Neonicotinoids provide unique environmental, economic and public health benefits, such as:

- Effective protection against invasive species which can harm important urban landscapes, including the Emerald Ash Borer which can devastate urban forests.
- Systemic insect control not provided by other chemical classes.
- Lower impact on many non-target organisms than older chemistries, protecting natural enemies, which allows for greater use of IPM strategies.
- Effective control of disease carrying vectors.
- Extended control, which limits the needed number of applications, and therefore limits the exposure to workers.
- Control of pests that are resistant to other chemical classes.

The Environmental Protection Agency (EPA) has not followed Europe's lead by suspending or banning the use of neonicotinoid pesticides. Instead, the EPA has been active on the pollinator issue by increasing the level of funding for research into integrated pest management, which has resulted in a reduction in the use of pesticides. Several studies, including a National Academy of Sciences study on the loss of pollinators, chaired by University of Illinois entomologist May Berenbaum, indicated that there is little evidence to indicate that banning this class of chemicals would have any positive effect.

The Congress and Obama Administration Should Focus on Solving the Problem

There is legislation pending before the House Agriculture Committee (H.R. 2692, the Saving America's Pollinators Act) introduced by Oregon Congressman Earl Blumenauer (D-OR) in response to the bee incident in the summer of 2013. The bill would effectively put a national moratorium on most neonicotinoid applications until an array of studies, including multi-year "residue build-up" evaluations can be completed. The bill's proposed moratorium could be lifted only if a final determination is made that the pesticides "will not cause unreasonable adverse effects on pollinators."

On February 24, 2014 the Pollinator Protection Caucus of the U.S. House of Representatives, chaired by Congressmen Denham (R-CA) and Hastings (D-FL), held a briefing on pollinator health and invited four groups to participate. AmericanHort's regulatory and legislative affairs director, Joe Bischoff, was asked to present the horticulture industry's perspective on the issue. During the briefing, Dr. Bischoff emphasized the importance of a holistic approach to research on the issue. He stressed that, "no concerned communities, including the bees themselves, would be served if we chase a red-herring and point fingers at an easy target like pesticides, for the purpose of political expediency."

When considering regulations surrounding pesticides, we feel it is important to look at what regulations are already in place. All pesticides used in Oregon must go through registration processes mandated by the U.S. Environmental Protection Agency (EPA) and Oregon Department of Agriculture (ODA). At the Federal level this happens under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Initial and ongoing re-registration is subject to a substantial review process. Registered products must meet the high standard of having "no unreasonable adverse effect on health or the environment." This means that the pesticides of concern in these cases have had extensive safety testing including:

- Honeybee acute contact toxicity (all outdoor use products)
- Honey bee toxicity of residues on foliage (if high acute toxicity and exposure likely)
- Field testing for pollinators (specific conditions)

While we can understand the concerns of beekeepers, and the public at large, the issue of declining bee populations unfortunately has no simple answer. In fact, research on Colony Collapse Disorder (CCD) has highlighted a complex interaction of factors that play a role in bee health. No singular cause of the problem has been

found. While pesticides are often noted as one factor, they are not considered the primary one.

The Nursery industry wishes to work with the EPA to stress the message of stewardship and compliance with label instruction. However, in the meantime we have growing concerns over the EPA taking further steps on pollinator protection through administrative action which would substantially affect turf and ornamental applications. The use of “advisory label language” is understandable when faced with unforeseen circumstances. However, we are receiving signals from a variety of stakeholders that the Administration is considering extending the label changes to other products that are used for foliar sprays. It is critical that Congress and the Administration understand that moving the industry toward specific application methods for systemic products (such as liquid solution or the use of dry broadcast formulations) without consideration of the efficacy and available alternatives will not solve the problem of declines in pollinator health.

Oregon Can Serve as a Model in Collaboration

While the furor over the death of bees received national notoriety, the discussion in Oregon was engaged by beekeepers, environmental groups and farm organizations. The initial bill mirrored the Federal bill introduced by Congressman Earl Blumenauer and would have moved neonicotinoids to a restricted use pesticide and substantially ban the use of the product in the state. Oregon House Bill 4139 could have taken a negative approach and pitting interest group against interest group—but that did not happen. Instead, stakeholders listened to one another and determined that a science-based approach to pollinator health would lead to a better solution. Over the next 2 years, stakeholders will roll up their sleeves and work with our land-grant university (Oregon State University), legislators, and state agencies to determine the most appropriate path forward. It is critical we work with interested parties to examine how to study this issue further and create a communication effort for the general public and industry. We all benefit when we move in a reasoned manner to evaluate trends in pollinator health, including the use of best management practices.

We must acknowledge our stewardship role in using these chemistries. When we use them, we must deploy them as part of a larger management strategy, and always remember to use them only as directed by the EPA-approved label. It is important that consequences and tradeoffs be discussed and that a decision on neonicotinoids not lead to economic harm, erosion of pollinator health, or increased human safety concerns during the application of pesticides at the nursery operation.

The nursery and greenhouse industry is working through our national association, AmericanHort, to engage with various chemical and registrant associations on the neonicotinoid issue and to conduct a survey of use at a national level. We believe an expanded look at pollinator health should be conducted and the nursery and greenhouse industry should be a reasoned voice in the discussion.

The public, environmental groups and agriculture have an opportunity to set aside short-term political points and work together on pollinator health. It is my sincere hope that Congress engages in the same spirit. Perhaps by working alongside one another, we can do what is right for pollinator health, environmental stewardship and economic prosperity of our agricultural sector.

Thank you for your time and attention.

The CHAIRMAN. Thank you, Mr. Stone. The linden tree is one of my favorite trees. There are a tremendous number of them on the Capitol if you noticed.

Dr. Fischer?

STATEMENT OF DR. DAVID L. FISCHER, DIRECTOR, POLLINATOR SAFETY & MANAGER, BAYER NORTH AMERICAN BEE CARE CENTER, RESEARCH TRIANGLE PARK, NC

Dr. FISCHER. Honorable Members, my name is Dr. David Fischer, and I am here today as the Director of Pollinator Safety on behalf of Bayer. I have been involved in the field of environmental toxicology and risk assessment for 27 years, published more than 20 peer-reviewed scientific papers and have supervised hundreds of studies evaluating crop protection products. I have led or participated in numerous scientific forums on bee health research, and I

am responsible for the management of Bayer's new Bee Care Center in North America. I thank you for the opportunity to appear before this Committee and for your interest in promoting pollinator health. Our industry recognizes the importance of honeybees to American agriculture, and we fully support collaborative efforts to promote pollinator health and sustainable agricultural practices.

Although the number of commercial honeybee colonies in the United States has been relatively stable since the late 1990s, bee losses following the winter season have averaged about 30 percent in recent annual surveys, more than twice what has been the historical expected average. Fortunately, beekeepers have been able to build up their colony numbers to meet crop pollination demands, but these losses highlight the need for more effective measures to promote bee health.

Most scientists and bee experts agree that multiple factors can negatively impact honeybee health. These include parasites, diseases, adverse weather, habitat loss, crop and hive protection products, nutritional deficiencies and hive management practices. Although some stressors are more important than others, the solution to bee health requires a comprehensive approach as no single factor is solely responsible.

A broad stakeholder group including members of the crop protection industry is working with the regulatory agencies to improve our understanding of pollinator risk assessment, particularly as it relates to a relatively new class of agriculture insecticides, the neonicotinoids. These products have been widely adopted by farmers and have replaced many older insecticides because of their effectiveness against destructive pests and they have more favorable environmental profiles. Comprehensive reviews of studies and databases comprising 15 years of research have shown these products do not represent a threat to honeybee colony health.

We strongly endorse ongoing research in meaningful stewardship practices, including the adoption of best management practices to avoid unwanted pesticide exposure. Although protecting honeybees from the unintended exposures to pesticides is a commitment shared by all agricultural stakeholders, this will have little practical consequence until we address the much broader and more significant threats to colony health. One threat in particular, which has been mentioned by everybody, is the *Varroa* mite, an invasive parasite identified by the United States Department of Agriculture as the single-most detrimental pest of honeybees and one most closely associated with colony decline. Understanding the impact of this parasite and how to best manage its destructive potential remains a critical gap in our effort to improve honeybee health.

The recent *Varroa* Summit sponsored by the USDA provided a forum for international experts to discuss areas of research that one day may provide relief. Other recent Federal initiatives such as those of the Natural Resources Conservation Service for both increased forage options for beekeepers, including the management of public lands to increase available forage for pollinators, could have a positive and lasting impact on bee health.

Although more research conducted under real-world conditions is needed to evaluate the effectiveness of these programs, engagement by all agricultural stakeholders is essential.

For more than 25 years, Bayer crop science has been committed to finding solutions to improve honeybee health. Our Bee Care Program was established to bring this experience and knowledge of bee health under one coordinated initiative, which includes opening our North American Bee Care Center, a state-of-the-art facility dedicated to improving bee health through collaborative research, education and training; launching our fluency agent, an innovative seed application technology to reduce potential exposures to honeybees during corn seed planting; implementing our Sentinel Hive Program in collaboration with beekeepers to monitor the health of colonies associated with agricultural production; developing our novel Varroagate technology and new chemistry to aid beekeepers in managing destructive *Varroa* mites; training more than 350 of our employees in North America as bee care ambassadors to promote bee health awareness in their local communities; and collaborating with leading researchers and participating in major scientific forums to remain current on the latest advances as well identify areas of fruitful bee research.

Pollinators and crop protection products are critical to agriculture. The inherent complexity and broad ramifications associated with pollinator health means that state and Federal Government will continue to play a vital role in helping to support both bees and agriculture. Our industry is committed to stewardship and the protection of beneficial insects, and we look forward to working with our government agencies in measures that protect bees and ensure agricultural sustainability.

Thank you once again for the opportunity to address this Committee.

[The prepared statement of Dr. Fischer follows:]

PREPARED STATEMENT OF DR. DAVID L. FISCHER, DIRECTOR, POLLINATOR SAFETY & MANAGER, BAYER NORTH AMERICAN BEE CARE CENTER, RESEARCH TRIANGLE PARK, NC

My name is Dr. David Fischer and I am providing this testimony as the Director of Pollinator Safety, on behalf of Bayer. I have been involved in the field of environmental toxicology and risk assessment for 27 years, published more than 20 peer-reviewed scientific papers and have supervised hundreds of studies evaluating the effects of crop protection products on pollinators. I have led or participated in numerous scientific forums on bee health research and am responsible for the management of Bayer's Bee Care Center in North America.

Bayer welcomes the invitation to appear before the United States House of Representatives Subcommittee on Horticulture, Research, Biotechnology, and Foreign Agriculture, to review current research and management strategies regarding insect pests and pollinators. For more than 25 years, Bayer has been committed to environmental stewardship and the protection of beneficial insects. We recognize the importance of honey bees to agriculture and fully support collaborative efforts to promote pollinator health and sustainable agricultural practices.

Of the many insect pollinators, none is more valuable to agriculture than the honey bee. The value of these insects (as measured by crop yield and quality) has been estimated at \$15-\$20 billion annually. Honey bees are important not only because they are efficient and general pollinators, but also because their colonies can be managed and moved wherever needed, which is especially useful given the demanding requirements for pollination services in American agriculture. The utility of these pollinators is not without its challenges, however. Commercial beekeepers have the difficult job of maintaining colony health over diverse geographies, often while facing unfavorable environmental conditions.

The number of honey bee colonies in the U.S. steadily declined from a peak of 5.5 million in 1950, primarily due to a reduced post-war need for honey as a sugar replacement and a decreased interest in beekeeping. Since the late 1990s, the num-

ber of managed colonies has stabilized at around 2.5 million—more than ½ of which are needed annually to pollinate the California almond market. Although colony losses of 15 percent are not unusual following the winter season, bee losses in the U.S. have averaged around 30 percent in recent annual surveys. Fortunately, beekeepers have been able to build up their colony numbers to meet crop pollination demands, but such losses highlight the need for more effective measures to promote bee health.

The first step in addressing this problem is the recognition that no single factor is solely responsible. Most scientists and bee experts believe that numerous stressors can negatively impact honey bee health—including parasitic mites, diseases, adverse weather, habitat loss, crop and hive protection products, nutritional deficiencies, and hive management practices. It is important to note that not all factors have equal significance to colony health, nor can the effects of some be realistically mitigated (*e.g.*, adverse weather). It is equally important to understand that the solution to bee health requires a comprehensive approach.

Knowing the factors that affect bee health is crucial, but determining the relative importance of each is even more significant, as it provides a clear roadmap to effective management. A broad stakeholder group, including members of the crop protection industry, are working with our regulatory agencies to improve our understanding of pollinator risk assessment, particularly as it relates to agricultural insecticides. Contrary to the opinion of some anti-pesticide groups, extensive research has shown that these products do not represent a long-term threat to bee colonies. Comprehensive reviews of studies and databases comprising 15 years of research were recently published by a diverse group of researchers and directly challenge unsubstantiated claims against pesticides as a significant cause of colony decline.

Despite the absence of a clear connection to colony health, our industry will continue to work with regulators to avoid unwanted pesticide exposures, through effective product labeling and the implement of meaningful stewardship actions that help minimize harmful interactions. We believe these measures have been quite successful, as the number of pesticide exposures to foraging bees is relatively rare, especially when considering the many millions of acres that are treated each year. Although any loss of bees associated with agricultural production is of concern, it is important to remember that infrequent accidental exposures are not indicative of the general health of honey bee colonies.

If the use of agricultural pesticides is not a major factor, then what is responsible for the decline seen in honey bee health? We may be closer to understanding this phenomenon than some might think. Large multi-factorial field research studies conducted in the U.S., Canada, Belgium, France and Germany all report that poor bee health correlates well with presence of parasitic mites and bee diseases. Correlation does not mean causation, but it does provide a useful map in attacking this important problem. This is especially significant when considering the biology and impact of the *Varroa* mite parasite on honey bee colonies in North America.

The *Varroa* mite is an exotic parasite introduced to North America during the 1980s. It feeds on honey bees and reproduces in the developing bee brood, while transmitting serious diseases. Immediately following its introduction, the number of colonies in Canada and the United States dropped precipitously, as beekeepers struggled to find a way to manage this destructive pest. A primary method of controlling *Varroa* infestations is through the use of miticides applied directly to the hive, but proper monitoring and timing are crucial. Though the use of miticides can be effective, resistance management and the lack of suitable alternative methods remain a concern among beekeepers.

The U.S. Department of Agriculture (USDA) and the Agricultural Research Services (ARS) have been at the forefront of this issue. The 2013 report from the National Stakeholders Conference on Honey Bee Health provided a comprehensive assessment of the most important factors affecting colony health. Of particular concern, as noted in the report, is the recognition of the *Varroa* mite as the “single most detrimental pest of honey bees” and one most closely associated with over-wintering colony decline. Recent scientific research has shown that the winter survival of honey bee colonies is largely dependent on the level of *Varroa* infestation and the higher colony losses seen in recent annual surveys appear to support this conclusion.

Understanding the impact of this parasite and how best to manage its destructive potential remains a critical knowledge gap in our effort to improve honey bee health. As a follow up to the stakeholder report, the USDA recently sponsored a *Varroa* Summit, providing a forum for international experts to discuss areas of research that one day may provide relief for one of the most persistent problems facing our nation’s beekeepers. Our success in combating this pest will only come from a continued focus and cooperative effort among all bee stakeholders.

Although the effects of the parasitic *Varroa* mite and its associated diseases are among the most significant threats to honey bee health, other factors require serious attention. Recently, representatives from our industry participated in a meeting with the Administration's Office of Science and Technology Policy (OSTP) and Domestic Policy Council (DPC) to discuss Federal initiatives on pollinator health and areas of potential collaboration with agricultural interests. Part of this discussion centered on initiatives by the Natural Resources Conservation Service (NRCS) to promote increased forage options for commercial beekeepers, as well as the management of public land to increase available forage for pollinators.

Initiatives aimed at *Varroa* mite management and increased forage options for bees can have a positive impact on pollinator health and sustainability. However, more research is needed to fully evaluate the effectiveness of these measures, especially under real-world conditions. To accomplish this objective, engagement by all agricultural stakeholders is essential.

As a leader in the agricultural industry, Bayer is committed to finding solutions to improve honey bee health. Bayer's **Bee Care Program** was established to bring our experience and knowledge of bee health under one coordinated initiative. This effort includes the following:

- The **North American Bee Care Center** is a \$2.4 million state-of-the-art facility that opened on April 15 at our Research Triangle Park, NC, headquarters. The center brings together collaborative research and education resources fully dedicated to bee health, housing a full laboratory and research apiary, honey extraction and workshop space, along with offices, meeting rooms, and interactive displays for pollinator research, education and training.
- Bayer has developed a new seed application technology to help reduce potential exposure to honey bees during seed planting. This **Fluency Agent** has been shown to significantly reduce dust and insecticide exposure when compared to the standard lubricants used by farmers to improve flowability and planting uniformity.
- As part of our commitment to research and stewardship, Bayer developed a **Sentinel Hives Program**, which is designed to monitor the health of selected colonies in North America associated with agricultural production. Working collaboratively with beekeepers, this ongoing initiative will evaluate best management practices to improve colony health.
- Bayer's novel "**Varroagate**" technology represents a potential new tool to aid beekeepers in managing destructive *Varroa* mite populations through an innovative means of limiting *Varroa* infestations resulting from mites carried by foraging bees to the hive.
- Bayer has trained more than 350 of its employees in North America as "**Bee Care Ambassadors**" to promote bee health awareness in their local communities.
- Our scientists collaborate with other researchers and participate in major scientific forums to remain current on the latest advances, as well as identify areas of fruitful bee research.

Other companies in our industry are engaged in similar activities, working with multiple stakeholders to promote bee health. Because of the inherent complexity and broad ramifications associated with pollinator health, state and Federal Government will continue to play a critical role in helping to support both bees and agriculture. Our industry is committed to stewardship and the protection of beneficial insects and we look forward to working with our government agencies in measures that protect bees and ensure agricultural sustainability.

Honey bees and crop protection products are both critical to modern agriculture. Although many issues associated with honey bee health are not new, the demand for pollination services has never been greater. It is only through a collaborative effort involving government, university research, private industry, commercial beekeepers and farmers that we can hope to protect this vital resource and ensure that American agriculture remains the envy of the world.

Thank you once again for the opportunity to address this Committee.

The CHAIRMAN. Thank you, Dr. Fischer, and we have been joined by Mrs. Vicky Hartzler and by the Ranking Member, Collin C. Peterson of the full Committee. And I am glad to have both of you here.

Just a reminder before we get into the questions, we will go in order by rank, and then we will go in order of attendance with the

one exception that we will let Mr. Peterson go first. And that reminded me.

Dr. Pettis, most of my questions will be for you as to the lead researcher for the USDA with regard to this issue. Our witnesses' statements, both written and oral, suggest that the *Varroa* mite is the single most detrimental problem affecting honeybee health. Do you agree with that and that the research on this pest is likely the task at hand, if you will, that we should address for the honeybees?

Dr. PETTIS. Very good question. I would say that if you had to single out one single individual factor in bee health it was the one thing, if we could eliminate it, it would have a big impact. I will say there is a lot of confusion about what Colony Collapse Disorder is. It gets mentioned by the media, and the media loves it. We define Colony Collapse Disorder as the absence of *Varroa*, the absence of damaging levels of *Varroa*. So we don't think that *Varroa* mites have much of anything to do with Colony Collapse Disorder, at least not directly. So it is, again, a mixed bag. If we had to single out one thing, *Varroa* mite would certainly probably be it, but it is certainly not the only thing going on in bee health.

The CHAIRMAN. And this gets to some of your previous indications that there are some constituencies that want to place the blame squarely on pesticides, particularly the neonicotinoids for honeybee colony loss. In Australia, neonicotinoids are registered just as they are in the United States as seed treatment. Beekeepers don't experience the losses that we have here in North America as well as Europe. The *Varroa* mite is not in Australia, is that correct?

Dr. PETTIS. Correct.

The CHAIRMAN. So just by definition, if we are making decisions based on the facts, without a mite problem, growers in Australia don't have the same impact.

Dr. PETTIS. I think other places around the globe, the beekeepers have not suffered as they have in the United States. U.S. beekeepers have suffered higher losses, although Europe has also suffered some fairly high losses when you look at winter losses. Australia is the only exception that doesn't have *Varroa*. So around the globe where honeybees are managed, Australia is the only continent that does not have *Varroa*.

The CHAIRMAN. So we are seeing this in South America and other continents?

Dr. PETTIS. *Varroa* is widespread everywhere else in the world.

The CHAIRMAN. The U.S. EPA is involved in ongoing litigation regarding the registration of several neonicotinoid pesticides. Would the data from Australia—these pesticides are being used in Australia is my understanding. Is it fair to suggest that regulatory agencies would be ill advised to oversimplify this problem in taking action against pesticides without the proper science and considering the other factors involved in this issue?

Dr. PETTIS. Chairman Scott, I would like to remind you that I am from the USDA and not from EPA—

The CHAIRMAN. Thank you.

Dr. PETTIS.—but I will do my best.

The CHAIRMAN. That is why you are here.

Dr. PETTIS. Thank you.

The CHAIRMAN. I mean, because you are—we don't allow the EPA to come in. I'm kidding.

Dr. PETTIS. Right.

The CHAIRMAN. I am kidding.

Dr. PETTIS. I think the level of agriculture in Australia—I am actually fairly familiar with the beekeeping in Australia, and the level of agriculture is not what it is in the United States. We have a much more advanced agricultural system, much more agriculture going on here.

I think the reason the neonicotinoid group gets mentioned a lot is the fact that it represents a new exposure to pollinators and that it is moving systemically in the plant, and it can be found in nature in pollen, unlike more traditional pesticides. But we still have issues with exposure in those realms as well.

So I don't have a strong opinion one way or the other, other than that the neonic raises a new level because of the exposure route.

The CHAIRMAN. Thank you for answering those questions, and again, we need to resolve this issue. It is extremely important to the United States as well as many other continents and countries, and we just need to make sure we take a fact-based approach and resolve this based on science and not emotion.

Mr. Schrader?

Mr. SCHRADER. I yield some of my time to—oops. Okay. I guess I won't then.

The CHAIRMAN. Sorry.

Mr. SCHRADER. No, it is fine. Well, I will go back to Dr. Pettis here. Can you talk about best management practices that are coming out? When do you think they are going to be out and what do you think they are going to be including?

Dr. PETTIS. Well, we have, as you noticed, Mr. Cummings was mentioning these public-private partnerships. We have been working with groups like Project Apis m. to try to develop some of these best management practices. We have some already, but *Varroa* mite in particular changes it. It becomes resistant to various chemicals that we use to control it. So we are always having to adapt those best management practices. We have some already in place. Project Apis m. and other groups have put together some of these who are constantly adopting them.

Mr. SCHRADER. Can you describe some of the practices?

Dr. PETTIS. Again, taking a kind of an integrated approach, not treating for *Varroa* unless it reaches a certain threshold. We know that the bees can suffer a certain amount of damage without using chemicals to treat them because the chemicals themselves that the beekeepers use are not benign. The other things are we are doing work with breeding and breeding resistant stock. We have a whole lab, ARS lab dedicated to breeding and genetics where we have developed a trait that confers resistance and also a line of bees that confer some resistance to *Varroa* mites. And in general, there are other aspects of bee health where we look at the timing of feeding. Like if we have to feed bees that are on a pollination contract and it is not so nutritious, we can feed bees supplemental food and help get them through that crunch time on a certain pollination contract. Cranberries come to mind, watermelons, things like that.

They are not totally nutritious, but the bees have to be there for pollination so we can do supplemental feeding.

So I would say these—things are ongoing.

Mr. SCHRADER. What about the genetic mapping? There is a lot of controversy nowadays on genetic modification. We have been doing it for centuries, frankly. We are just doing it differently nowadays. What are the prospects for improving bee genetics even beyond what you have described?

Dr. PETTIS. We are looking for marker-assisted traits in bees that would confer, say, *Varroa* resistance. We are not going to have a bionic bee. We are not going to modify bees in that way. But we can use certain better techniques to do marker-assisted breeding, and we are doing that.

Mr. SCHRADER. Very good. Dr. Fischer, can you talk a little bit about the seed application technology that you are working on?

Dr. FISCHER. Yes. We have a new additive that is added to the seed hopper we call fluency agent. It is a seed lubricant is what it is, and what has occurred in some instances is with pneumatic planters that are in use, as the seeds are moved through the planter and put into the ground, they rub against the machinery, they rub against each other and a little bit of dust is produced. And that is exhausted by these pneumatic planting systems. So what we are trying to do with the fluency agent is eliminate this dust because this dust has the potential to move off-site to flowering plants where bees can contact them. What we have found is with our fluency agent, we can reduce the dust abrasion by anywhere from 50 to 90 percent, and we are actually working with a number of universities and other stakeholders. There is actually a corn dust research consortium that has been convened by the Pollinator Partnership. I saw Tom Van Arsdall here today. And so that group has sponsored research to really look at how effective is this and what are the best ways that we can—what are the ways that bees can be exposed to these seed treatments.

But seed treatments in general are the best way to use an insecticide. You get it into the ground. The worst way to use an insecticide and expose bees or the way that has the most potential to cause exposure is to spray a bee attractive plant when it is blooming, the Linden tree example. When you spray a pesticide, you result in about 1,000 times greater residues than the pollen and nectar that the bees are collecting than if you use the chemical systemically.

So that is really—the message I would have is systemics, when they are used carefully and properly, are really the best way to go. And we want to be careful with insecticides, spraying anything, any plants that are bee-attractive.

Mr. SCHRADER. Mr. Stone, you talked about improper application. Would you describe what happened as improper in that one incident in Oregon?

Mr. STONE. Thank you, Ranking Member Schrader. Absolutely. Linden trees, which are beautiful as the Chairman indicated, when they flower, a landscaper came and sprayed it on the whole tree. And it is a big attractor to bees and a whole bunch just came in and then they got in contact with it. And when you are in direct

contact in that application, it is fatal. And so it was an improper use of that application.

Mr. SCHRADER. And what is the right recommendation for application?

Mr. STONE. For Linden trees, it is when it is not in flower. So it is an attractor to the bees. Oregon is fairly well north, and bees are out only at a certain part of the year, and you have to spray it when the tree is not in flower.

Mr. SCHRADER. Thank you. I yield back.

The CHAIRMAN. Mr. LaMalfa?

Mr. LAMALFA. Thank you, Mr. Chairman. Mr. Cummings, again, thank you for traveling as far as you did to be part of this here today. You stated, did you say it was $\frac{2}{3}$ of U.S. bees are used at one time or another during the year for almond pollination?

Mr. CUMMINGS. That is approximately true. It depends on when you take the baseline. So for example, last year the NAS report said there were 2.5 million colonies of honeybees. There were overwintering losses. If you use 2.4 million as available, 1.6 are required, around $\frac{2}{3}$. It is not an exact number, but it is pretty close.

Mr. LAMALFA. And for California, their need starts about that first week of February, correct?

Mr. CUMMINGS. That is correct.

Mr. LAMALFA. Okay. So this is an important thing to the almond industry, up and down our state—

Mr. CUMMINGS. It is absolutely critical.

Mr. LAMALFA. Could you emphasize that a little bit? I know we are short on time.

Mr. CUMMINGS. Yes. Most almonds are not self-fertile nor self-pollinating. There are some newer varieties now that are self-fertile, but they still do benefit from pollination. And that means moving the pollen from the anther of the flower to the stigma of the flower. So 90–95 percent of the almonds in California need to be cross-pollinated which requires the honeybee as a vector to move the pollen from one variety of almond to another variety of almond, and the percentage of nut set is highly correlated with the number of pollen grains that are transferred. So the better and more thorough pollination transfer of pollen grains from one variety of almond to the other variety of almond dramatically improves the nut set and our crop. And this crop has continued to grow. It is 840,000 bearing acres this year, and that crop value will probably close to maybe \$7 billion—I am not used to talking in B's—\$7 billion.

Mr. LAMALFA. We do it all the time around here. So the challenge the panel has talked about a little bit here, we hear about the mite, we hear about pesticides as a possibility, we might have other conditions with, say, our drought in California causing challenges. What would you rank, how would you rank, say, the top three you face or we face in California or for almonds across the board, what have you?

Mr. CUMMINGS. In growing challenges or bee challenges?

Mr. LAMALFA. Bee challenges.

Mr. CUMMINGS. Bee challenges would be forage, the *Varroa* mite and pesticides.

Mr. LAMALFA. Forage?

Mr. CUMMINGS. Forage is nutrition, is that—this is my opinion—CCD and winter losses and honeybees are highly correlated with cumulative stress, and the largest stressor as we have discussed is *Varroa* mite. The second largest is nutrition. So just the same as you and I, if we have a good, balanced diet, we are able to tolerate stressors in our lives far more better. And with the drought in California, all of the growing regions for almonds in California are ranked as either extreme or exceptional drought, and there are no flowers. And this is true as well in many other places across the United States which has reduced the amount of natural forage that are available to honeybees. So forage, *Varroa* mite and then pesticides.

Mr. LAMALFA. I know first-hand. I know other beekeepers that they sell honey at some of the various festivals and such, and they will have different varieties that come from star thistle or meadow from of all things, and their varieties are down on some of those types due to some of our recent drought.

It was mentioned on the panel earlier that you have some other supplements, other things you were working with in feeding the bees. What was that food, the SuperBee?

Mr. CUMMINGS. MegaBee.

Mr. LAMALFA. MegaBee. That is right. My brother has the Super Bee Dodge. So I got them mixed up. Okay, MegaBee. So you are taking steps forward to really try and enhance what you have naturally. Talk about that a little bit more, too, on how you are making bees healthier and more nutrition, *et cetera*.

Mr. CUMMINGS. Sure. Our bee operation with over 10,000 colonies of bees spends around \$½ million a year on supplemental feeds because of the dearth in available forage. The natural forage is absolutely indispensable. It comes in with different bacteria. It helps ferment pollen that is deposited into the comb and to bee bread which converts into amino acids. Jeff could elaborate on this far better than I could. But it is absolutely critical for a good diet.

The supplemental feed helps. Certainly the proteins especially help. Project Apis m. and the Almond Board of California have been sponsoring programs now to encourage almond growers and other farmers in California to plant forage. And we do so alongside of our orchards so that before and after almond bloom, and even during almond bloom, there are alternatives, natural forage, pollens and nectars available to the honeybees.

Mr. LAMALFA. So a good ground cover is helpful to you all, too?

Mr. CUMMINGS. Absolutely. The CRP grounds in North Dakota are critical as that acreage—a lot of it has been converted over from CRP into soybean propagation and corn because of the value of those commodities make that ground now economically viable, and that has been a tremendous loss for the bee industry. Approximately 20 percent of all the honey made in the United States is made in North Dakota, anywhere from 300,000 to 500,000 colonies a year go to North Dakota after almond pollination, pollination of other crops. And so that CRP ground is critical, and the planting mixture is not only the acreage that is available but as well the mix of the CRP of the cover crops. So a richer mix of legumes and flowering plants in that CRP mix will make a tremendous difference.

Mr. LAMALFA. Okay. Thank you. I might come back to you on bees and citrus as we talked about in California a couple years ago. So I will yield back, Mr. Chairman.

The CHAIRMAN. Mr. Vargas?

Mr. VARGAS. Thank you very much, Mr. Chairman. First, I would be remiss if I didn't thank all of you from the agriculture arena for your support on immigration reform. You have been stalwarts on that, and I appreciate it very much. By the way, CCD, as a Catholic, usually stands for something very different, Confraternity of Christian Doctrine. I hope we can get back to that and fix the honeybee.

I want to ask about best management practices. What is the best science? What are the best management practices that we should have out among growers to protect the bees? I agree with how important honeybees are to California. What are the best management practices? Anyone want to take a stab at that? Mr. Stone?

Mr. STONE. Thank you for the question. The best management practice, when this issue first was raised, we brought together our growers, our retailers, our landscapers all into one place, and we wanted to try to get to the root of the problem. An integrated pest management program is probably the best way to go about it because as I stated in my oral testimony, if you use just one type of pesticide, any pest, it doesn't matter if it is something that impacts the bees or not, will develop a resistance to it. So what you want from the nursery perspective is to make the cleanest plant possible to ship to customers and to rewholesalers that are free of any pathogen or pest because the last thing you want to do is have it spread all over the country, and then it is a bigger problem for USDA in trying to manage it. So the best way that we have seen it is that you want to be smart. People forget how much pesticides cost, and that you just don't throw it on there. You certainly don't throw on a pesticide that you don't know how effective it is going to be or what is it going to do to the plant because you don't put anything that is unknown on there.

An IPM, integrated pest management program, is the best BMP that you can start with but then also just good, old-fashioned common sense.

Mr. VARGAS. How about you, Mr. Cummings? I know that we in California are quite sophisticated in the farming industry. What would you say? I heard your answer about the forage and the severe drought and the other issues. But what in California should we be doing or what are we doing that we shouldn't be doing?

Mr. CUMMINGS. I will start with turning on talk. The first most important thing is really communication and coordination between growers of pollinated crops and pollination services, beekeepers, to know what each other is doing and what our plans are. So for example, in the almond industry is that, of course, I own a bee business, but we also use other bee businesses. We coordinate when the bees are going to be moved into the orchards. We discuss what other crops might be blooming in the area, what other crops might be experiencing pesticide applications in the area. The bees are brought in, they are strategically placed, water is provided. This year we have been having this horrible drought, is that we provide water for the honeybees. We coordinate when the bees are moved

out. We try to coordinate our sprays and communicate with our beekeepers of what we are applying. We choose the softest materials and most bee-friendly materials that are available and try to put them on the orchards after most of the pollen has been gathered so that there is as little direct contact between pesticides and the honeybee as possible.

Integrated pest management has been mentioned, and that is critical. That is something that the bee industry is deploying more and more with some of their tech transfer teams that are like our certified pest advisors, our CPAs that advise us with our crop production going out now and working with beekeepers to know, to be able to identify what do they have in the colonies. Do they have foul-brood? Do they have mites? Do they have nosema? When is the appropriate treatment levels to try to use more but use it more timely—excuse me, to try to use less.

Mr. VARGAS. Less, yes.

Mr. CUMMINGS. But more timely. So those are examples of different best management practices, and in the end, I think it goes back to the collaboration between pollination service and pollinated crops.

Mr. VARGAS. Thank you. Thank you, Mr. Chairman. I yield back, sir. Thank you.

The CHAIRMAN. Thank you. Mr. Cummings, how long does a bee live? What is the average lifespan of the bee?

Mr. CUMMINGS. I will defer to Dr. Pettis. I do know from my honeybee production is that if you are in a northern latitude where the days are very long and there is a hell of a sweet clover bloom, those bees are working long, hard hours and don't live nearly as long as a well-nourished bee in the fall that goes into semi-hibernation in preparation for producing brood for almonds. So I believe 45 days to as much as 5, 6 months.

Dr. PETTIS. Yes, we have winter bees and summer bees. In the summer, they can be very short lived, even in a heavy honey flow, even 15 or 20 days. But the average is probably 35 days in the summer, 200 days in the winter.

The CHAIRMAN. Mr. Collins.

Mr. COLLINS. Thank you, Chairman. As a new Member of Congress and somebody that came in with a firm belief that Washington rarely knows best, in a critical role that I see us playing on Committees is one of oversight in looking out for business and Americans to avoid overreach and the like. So my question, really, to Mr. Cummings and to Mr. Stone, whose livelihood depends on the bee population, would just be the simple question, should Congress be playing any role whatsoever in this particular issue? And as we are finding out, there are many different threats to the honeybees and there is a lot of collaboration going on already to protect your industry. With Dr. Pettis sitting there, as I am hearing this discussion, it sounds like the USDA is actually working collaboratively with the industry, that they are looking out for what is best for the industry, whether it is best practices or the like and that right now, as I sit here, this has been educational. I don't know that I see any pressing need in this case for Congress to step in, unlike other areas where we have seen overstepping by the EPA and we need to make sure that we don't define mud puddles as

navigable waters. I don't see that issue here with the USDA, and I just wonder what your opinion is of the collaboration between the USDA, your industry, and do you really think in Congress there is a role for us to play in this very complicated issue? Mr. Cummings, you want to or—

Mr. STONE. We did rock, paper, scissors—

Mr. COLLINS. Okay.

Mr. STONE.—so that I would go first, Congressman. Thank you for the question. The question about whether or not you should act, it is how you act and what you direct. And there is a bill before Congress that talks about putting off the ban of the use of neonicotinoids until further review can be done by the Environmental Protection Agency. I think that is well-intentioned. I just don't know if it is the right thing to do.

Mr. COLLINS. That to me would be the overstep of Congress, thinking we always have a solution. We rarely do. So yes, that would be—I am fully with you on that. That would be an overstepping. We would never support that.

Mr. STONE. One of my own Members of my delegation introduced the bill, so I can't be too cheeky about that. But I would submit to you, though, my written testimony is about the role of Congress is to help direct research. There is a lot of research out there, and it is about accumulating that research and finding out not only what are the options for the use of this particular type of pesticide which was misapplied in Oregon, okay? Misapplied. And finding alternatives, helping work with our chemical companies about finding alternatives that will work well and have not been—and you don't want to harm the pollinator community, but we also don't want to increase health risk for workers who apply a pesticide. So my urging to you is to be collaborative, involve stakeholders, folks in the environmental community, the beekeeper community, the farm community, have them come together and work with researchers to try to find a suitable path forward.

Mr. COLLINS. And again I would think that is a continued role between the industry and the USDA.

Mr. CUMMINGS. I would like to echo Mr. Stone's remarks and just point out, it perhaps might be subtle until you give it a little thought is that as a farmer, I like to have the broadest array of arrows in my quiver to address pests. And if you start removing those or the EPA does, then I have to go back, I have to fall back to some other alternative that still is available, and oftentimes those aren't nearly as beneficial to the honeybee.

Second point would be the continued funding of *Varroa* is that I think the number, Mr. Chairman, from \$16 billion to \$20 billion just goes for the increase in value of the almond crop in the last 2 years, is that we need to address and we need to get a solution for *Varroa* mite. It benefits 90 different pollinated crops in the United States, about $\frac{1}{3}$ of our diet in all the states. So funding of *Varroa* mite research is critical.

And then last, something could be done at little expense is continued support of the CRP program and encouraging a richer mix of flowering species, not just grasses but flowering plants in the CRP mix to enhance the natural forage that is available to honeybees. I can't imagine it would incur any additional cost.

Mr. COLLINS. Yes. No, thank you for that testimony. What you have really pointed out were, when I say what is the role of Congress that is on a pro-active way, what you have given me is two examples of where Congress should not be pro-active, which I fully agree with. One is the EPA, the other is banning the neonicotinoids. That is the case of Congress, as I started out by saying, the overreach we shouldn't do and should back off, and again, this is one where I think what I am sensing is USDA is doing a very good job in working with the industry in a collaborative effort. We should let that continue. And I also do agree the research dollars and making sure they are well-used with input from you is something we should be cognizant of as we pass our appropriation bills. Thank you. I yield back, Mr. Chairman.

The CHAIRMAN. Thank you. Mrs. Hartzler.

Mrs. HARTZLER. Thank you, Mr. Chairman. Thank you, gentlemen. I am very interested in this. I am a farmer myself, but a few years ago I found a bee colony in a dead tree in our pasture and it was kind of fun. We had a beekeeper come out and help harvest that, and they saved the colony and so they were going to treat them for the mites and make sure they were able to be healthy for a long time. And I got to try to strain honey out of the old combs, and it was a lot of fun. So I certainly appreciate the role of bees and appreciate what you do.

And I was just wondering, while much attention has been given to the *Varroa* mites, it is my understanding that other parasites and pests may affect honeybees. So I was wondering, what is the assessment, your assessment of the impact of these pests individually and collectively on bee colonies? And I guess Dr. Pettis, maybe?

Dr. PETTIS. Well, certainly the *Varroa* mite is not the only problem affecting honeybee health, and in fact, viruses are a good example of that. Honeybees all have viruses at low levels, but given the interaction with the *Varroa* mite, those levels of viruses can spike. Well, the same can happen with something like nutritional stress or other stressors. So the pathogens, things like bacteria, fungi and viruses, are there present in the bees, and when bees are under stress, then these things can manifest themselves, just like our own bodies if we are under various types of stress. It is the pathogens that often kill the bees. There are some primary stressors that are driving that.

Mrs. HARTZLER. That is very interesting. What do you think the most pressing need in research is right now and is there adequate funding for that in our budget, the President's budget? Dr. Pettis, maybe?

Dr. PETTIS. I am kind of echoing what they were saying about some of the issues. I think the land use and forage efforts, CRP and others that USDA has on a number of fronts, are where some of the biggest impact can be made. Beekeeping in the United States has changed. It used to be about honey production. It is now about pollination, and the average colony, the average commercial colony, gets rented three to five times. So by definition, they are in an ag setting, but they are only getting one source of nectar or pollen, and they always do better on a mixed diet. So if they can get mixed

flowers and CRP and other programs can provide that, then they will do better.

So diversifying the agricultural environment through these land management programs can have a huge impact.

Mrs. HARTZLER. I think that makes a lot of sense, and it wouldn't necessarily incur that much cost, like you say, because we already have the CRP programs and just start promoting that more. So I really appreciate that information.

USDA estimates bee colony losses normally average 17 to 20 percent per year, but in the winters of 2006–2007 and 2007–2008, losses averaged higher than normal rates, about 30 percent per year. So I was just curious, how is this number calculated? Who is surveyed? How have losses trended in the more recent years, 2011, 2012, 2013?

Dr. PETTIS. So in 2006–2007 when we started identifying Colony Collapse Disorder as a major impact on bee losses we started doing a survey. USDA Animal and Plant Health Inspection Service, the apiary inspectors of each state got together and we did a survey of the beekeepers, what were your losses like through the wintertime. And so we started out with just manually calling things. We moved online, and now it is funded by a NIFA grant. Bee Informed Partnership does that. NASS, National Agricultural Statistic Service, has a honey survey that they do, have done for 75 years. There is talk about NASS taking over that loss survey, and that would be good because then they reach out to all beekeepers and get total representation. The survey that we have conducted has represented about 20 to 40 percent of the managed colonies in the United States. So it has been fairly representative, but it is not as good a job as NASS could do in doing a loss survey.

Mrs. HARTZLER. How have the losses compared the last few years?

Dr. PETTIS. Two or 3 years ago we had a loss of about 22 percent, but on average they have been just at 30 percent or greater. And we will have a new number May 6th. We have a report that will come out for last year's losses. So they are still averaging in the 30 percent range which again is at least ten percent higher than we expect with *Varroa* mite. So very simply, before *Varroa* mite, we had about ten percent loss. With *Varroa* mite, we moved up to almost 20 percent loss, and now with all these other factors, we are up to 30 percent loss. And beekeeping is kind of unsustainable at that rate.

Mrs. HARTZLER. Absolutely. Well, this is a very, very important issue, and I appreciate you being here today. I appreciate, Mr. Chairman, you holding this hearing because it is very vital for agriculture in many ways. So I yield back. Thank you.

The CHAIRMAN. Mr. Denham from California.

Mr. DENHAM. Thank you, Mr. Chairman. Dr. Pettis, as you know California is experiencing a tremendous drought right now. Secretary Vilsack has stated that USDA is acting to mitigate the crop losses due to the drought. What types of challenges or loss do you expect to see with the honeybees?

Dr. PETTIS. Well, it is a challenging question. We have that survey under way right now, and we will have that figure May 6th. I do know for California specifically, this year, coming out of al-

monds, the keepers are normally there from January, February, into early March, and there are other things blooming in California. This past year there has been virtually nothing blooming in California due to the drought. So this particular year in California was unusual and that the bees had almonds and they had virtually nothing else.

So we talk about the Midwest as being important, the Dakotas and the Midwest, because that is where the bees summer. Sixty to 70 percent of the bees summer there, and then they go to California, but foraging California is critical as well. And I don't know where the loss figure will go this year.

[The information referred to is located on p. 41.]

Mr. DENHAM. And do you know if USDA is planning anything to mitigate any loss or address any of the challenges that we are facing with our pollinators?

Dr. PETTIS. I would have to get back to you with specifics on whether we were looking at mitigating. I will say that this fall we are planning to hold a summit on forage that will look at forage issues this coming fall. But I don't know about mitigation. I have to get back to you on that.

[The information referred to is located on p. 41.]

Mr. DENHAM. Thank you. Mr. Cummings, have you seen your costs increase? Have you been forced to pay higher prices due to the Colony Collapse Disorder?

Mr. CUMMINGS. Prices have definitely gone up from about \$40 or so early in the 2000s to up to about \$180 now. There was a Gianini Foundation study that was published about 3 years ago, and they did a correlation between two things, two driving factors for the cost of almond pollination. One of them was the dramatic increase in acreage and therefore the demand for honeybees, and then second, Colony Collapse Disorder. The conclusion of that study was that the increase in costs are driven about 50/50, 50 percent by the increase in acreage and 50 percent by Colony Collapse Disorder and the impact on the available supply of honeybees to the almond industry.

Mr. DENHAM. Thank you. Along with over quadrupling of the cost of honeybees, how tough is it to find them these days? And is it getting tougher?

Mr. CUMMINGS. You can always find boxes to put in the field, but whether that is a good viable colony and how strong that colony is, as I know you know as you are an almond farmer. So that is why I immediately started chuckling is there are a lot of growers out there that think they have bees. It always amazes me. You know, to produce a pound of almonds, 13 percent of my variable cost of production, labor, water, equipment, fertilizer, 13 percent of our cost to produce a pound of almonds is for honeybee rent. And growers need to be more active and getting out there and looking in their boxes and seeing what they have because some years are dramatically better than others.

Mr. DENHAM. Thank you. I yield back.

The CHAIRMAN. Thank you. Mr. Schrader, do you have any closing statements?

Mr. SCHRADER. I just appreciate the panel. It has been very informative. I think it has gotten us a little better appreciation for

the variety of problems that are causing problems in our pollinators right now. I appreciate the great work, research, and thoughtful discussion that you guys bring to the table. Hopefully we will mirror that in what we do and what we don't do here in the halls of Congress. And just for the record, I am not that legislator from Oregon that introduced that bill. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. LaMalfa. I think he had another question. I'd ask the gentleman if he had—

Mr. LAMALFA. Oh, thank you, Mr. Chairman. One more follow-up on that, Dr. Fischer. There is a lot of research you are going to have underway soon, and I am just wondering what do you think can be developed in the future? What will your emphasis be to improve bee health situations with ongoing research? We talked about it isn't just *Varroa* but we also have other pests and disease that can be an emphasis. What do you have on that, please?

Dr. FISCHER. Well, we are focused largely on *Varroa*. We are working on some other things, but we are working on some new ways to control *Varroa*, ways to apply the chemicals in a novel way so that the bees sort of self-dose, and beekeepers are able to rotate modes of action to combat resistance. We have some new chemicals that we are screening to see if we can come up with something novel. We are also working on small hive beetle which is a pest that certainly in North Carolina and the South causes some problems, some ways to control the small hive beetle. And just general beekeeping practices. You know, how can agriculture and beekeeping coexist better? A number of people mentioned it. When you talk to beekeepers and growers, a lot of times if they just communicate better, they can work out a lot of the conflicts. But we are trying to be a place where we can bring stakeholders together. We can work with multiple stakeholders to find some of these solutions.

Mr. LAMALFA. Thank you. And Mr. Stone, Mr. Cummings as well, coordination was mentioned. Thank you, Dr. Fischer, on that. It makes a lot of sense where you have—for back hoe folks they have 1-800 Miss Utility phone number. And so it would seem like is the system, Mr. Stone, Mr. Cummings, working well enough on coordinator or is there more that can be done, more that perhaps we could emphasize if it is appropriate to have that coordination? You know, we have talked about a lot of things. Back when I was in the state, there was a lot of controversy over citrus as a place to house bees over-wintering, so they would have a food source until they can get back into the spring but some controversy over when and where. So could we do better on the coordination with the timing, with when material might be applied, or even as was talked about, more places to forage? I have a little idle land that we can't grow anything on, maybe a positive program where we would have certain types of cover crop that would be helpful to bees. What could we do in all this coordination area, either with government or not?

Mr. CUMMINGS. The industry is doing a lot of that on their own and getting better every year. And so by way of example, it has really only been the last 3 or 4 years that we have clearly identified what a deficit we have in the availability of natural forage. So

Project Apis m., in conjunction with the Almond Board of California, has been sponsoring plantings of cover crops in fallowed areas adjacent to almond plantings, providing free seed as a matter of fact, also developing best management practices and enhancing communication within the grower community. And obviously, the cost of the input to almond growers is getting almond growers' attention, and they are paying more attention also. We are making great strides in those areas. There is clearly more opportunity, but we are already doing very well.

I will give you an example. Blue Diamond has a field staff, a dozen different field staff members that service the needs of our grower owners, and they are a wonderful vehicle for getting the word out, communicating to growers the things that they ought to be concerned about and promoting the communication and cooperation with beekeepers, developing a beekeeping strategy, a pollination strategy. And so at least the California almond industry is evolving in that area in recognizing the value of natural forage and doing what we can through Project Apis m. and the Almond Board to advance that.

Mr. LAMALFA. And certainly we have some of your colleagues set up bee yards in some of our idle areas. Mr. Stone was talking about—and there is this emphasis again of Congress, do something, right? And so we hear a piece of legislation might be to have a complete ban on the neonicotinoids—sir—

Mr. STONE. I'm not keeping—Congressman.

Mr. LAMALFA.—to some extent, and you know, there is always an overreaction it seems on things. So what I have heard is that when you have a misapplication, somebody using the material wrong, and if the label is not defined well enough for certain situations, those folks making the law have stepped in and further defined the label so people use the material will better use that. And if they continually use it inappropriately, there is going to be a penalty for that. Do you believe we are on track using this better information, better emphasis on information? Are we on track to doing that without having to take a drastic measure on bans as is some folks' natural course on these materials?

Mr. STONE. Congressman, I appreciate the question. I think that the EPA's response initially was actually pretty helpful. They are creating an insignia that looks like a bee on something that could be potentially toxic to the pollinator community and just reiterating the fact that you need to take into consideration when you are applying this particular pesticide that you can't do it when bees are present.

One of the big challenges that we have is that we face language barriers as well as we do anything else with some of our applicators. So you want to try to use as many visuals as you can, and the EPA should get a little bit of credit for putting that forward. Now, saying that we should uniformly then ban until the science catches up, is a little bit of an emotional response. But I would say that your role, my plea to you is that I believe that the Congressional role is to urge the type of research, get the type of alternatives that we have, increase public awareness. One thing about the bee deaths in Wilsonville is that it sure as heck got a lot of public awareness to it. But I would submit that this type of pes-

ticide—the neonics are involved in a lot of different products ranging from flea and tick items all the way to the stuff that you would buy to apply as an agricultural operation.

Mr. LAMALFA. Real quick question.

The CHAIRMAN. Gentleman—

Mr. LAMALFA. How many bees per bee box? How many bees reside in one bee box?

The CHAIRMAN. This is the last question until we go to Mr. Costa.

Dr. PETTIS. Twenty thousand to 40,000, depending on the season.

Mr. LAMALFA. Thank you. Okay, thank you, Mr. Chairman. I appreciate it.

The CHAIRMAN. Mr. Costa.

Mr. COSTA. Thank you very much, Mr. Chairman, for holding this hearing of the Subcommittee. It is kind of a follow-up question by our colleague, Congressman LaMalfa. In 2008 we put funding in the farm bill to try to deal with the concerns with the loss of bee colonies throughout the nation, and in 2014 we did so as well. And I just finished a bag of almonds here, and knowing that California produces 95 percent of the world's almonds, obviously this is important, but it is also important to a lot of other commodities that depend upon the pollination as well as a whole lot of other important purposes that bees produce that are just now beginning to come to light.

My question to those of you who would like to respond is, are we doing a good enough job coordinating the money from 2008 and 2014 with the private sector money? You mentioned the California Almond Board's efforts on research to deal with the decline of bee colonies. Is the money being, both the public and the industry money being used and coordinated well to really determine not only the contributing factors to the losses but also a strategy to address those losses? Who would like to respond?

Dr. PETTIS. I will just say that within USDA we hold stakeholder meetings that include beekeepers but also growers and other stakeholders to get input and what things we should be addressing. And there are good examples of us working with private partnerships, with the Almond Board and things.

Mr. COSTA. Well, I know there are examples. I guess I am trying to find out is your sense is it working and what is not working, I guess, and what could we do better? It is all perfect, huh?

Dr. PETTIS. It is not perfect, no. The health of the honeybee is not perfect.

Mr. COSTA. No, we know that.

Dr. PETTIS. Honeybees—

Mr. COSTA. But I am wondering as this isn't a new issue.

Dr. PETTIS. And beekeepers are suffering. We have looked at honeybees as something kind of mystical. They produce honey and wax, but it is really the pollination. And we need to think of it more as livestock, and we have not done that. We have not done that in the past. They are livestock, and they have one mission and that is pollination, at least in agriculture. They do all these other magical things as well, and working with the growers, the different growers that depend on bees for pollination, I agree with doing that, but it could always be improved.

Mr. COSTA. Yes, but this Committee's job in part is oversight. What I am trying to understand in terms of our oversight role is this; is the Federal funding being used well, as it should be. Are either taxpayer dollars or industry-related dollars to coordinate with the various private entities or associations really getting to the bottom of this. Are we on the right track? Is there an evaluation? How do we provide the oversight to know that taxpayer money is being spent wisely? No one argues the cost.

Mr. CUMMINGS. I can try to speak—

Mr. COSTA. I don't argue the cost.

Mr. CUMMINGS. I can try to speak to at least a part of this. As the Chairman of the Bee Task Force for the Almond Board of California and as the Past Chairman of Project Apis m. as well, we review a lot of bee research proposals that either the Almond Board funds or Project Apis m. funds, and we have learned a lot as well over the last several years. We now have a Scientific Review Committee at the Almond Board, at Project Apis m. At the Almond Board we have the Bee Task Force to prescreen these research proposals and evaluate them and ask questions of where is other money coming from? What areas of specialty exist out there with the ARS labs? And we continue to fund that. The Almond Board of California has spent a lot of money at the Carl Hayden Research Lab—

Mr. COSTA. No, I know you have.

Mr. CUMMINGS. To your question, we feel like we are getting good value there because we are electing to spend our money there. We are a client in a sense.

Mr. COSTA. I got that. I am just trying to understand from our oversight role, if there is something we should be doing. I would like to see what the results of our efforts are and make sure we are getting the best bang for our buck and getting to the root causes of the CCD, how we fix this problem. Where are we?

Dr. PETTIS. I will take another stab. As Dan mentioned earlier, we have actually probably in the last 5 years recognized that honeybees are suffering from lack of forage. And so all the USDA and even the private efforts by utility companies and others to increase the forage is money well spent. So there is some of that that is Federal and there is some of that that is private where these private-public partnerships are developing around forage. I think that is an area where we can have immediate and lasting impact.

Mr. COSTA. Mr. Chairman, my time has expired, I am only trying to find out if we invest X amount of dollars, will we arrive at a solution in 2 years or 4 years? Is the question one of resources? Is the question one of research? Or is the question that we just don't know enough yet? I understand more forage is better for bees. I got that. But I don't know that we are any closer to solving the cause. I have read that there are a number of factors that are resulting in the decline of the colonies. What I have not heard is how we fix this decline.

Dr. PETTIS. You have heard that it is multi-factoral. There are various factors involved. And so the answer is going to be complex. I think in this year's President's budget there is some \$25 million pollinator—I don't know what we call it—pollinator initiative. And I was asked specifically by a number of individuals, would that

turn bee health around, and I could not honestly say that even that infusion of money would turn it around tomorrow. And the reason for that is it is very complex. It is not going to take one answer. So we are going to have to take—research helps with the land use issues and things like that help as well. So I couldn't honestly say that the huge infusion of money would turn it around tomorrow.

The CHAIRMAN. Mr. Davis?

Mr. DAVIS. Well, actually, I am glad Mr. Costa went in front of me. My question is actually built on what his line of questioning was, and I first want to apologize to the panel that I came in late. I had to go see some veterans on an honor flight who served our country. And that was our priority today.

But this is a very important issue. As a matter of fact, I was actually out in the Central Valley of California with my good friend, Mr. LaMalfa, and Mr. Valadao, and saw parts of agriculture that someone in the Midwest doesn't get to see very often, including almond trees, pistachio trees and other operations.

I have a distinct concern of the Colony Collapse Disorder, and when you look at Mr. Costa's questions about how are we utilizing our investment from the Federal Government to address this problem, I find it very interesting, Dr. Pettis, your comment that \$25 million might not solve the problem. And it goes to the old adage that not everything needs money to fix the problems.

And with that in mind, I would like to go to Mr. Cummings and ask you. You know, USDA has a publication called *Using Farm Bill Programs for Pollinator Conservation*. Can you tell us how you in California have been able to leverage some of these programs?

Mr. CUMMINGS. I am not familiar with that document so—

Mr. DAVIS. Well, better yet, have you guys in the private sector who are dealing with this issue on a regular basis, have you been able to leverage any of our farm bill programs, USDA research programs, to help further your research to get to the point where we start to solve problems?

Mr. CUMMINGS. You know, I am not prepared to answer that on behalf of the industry. Perhaps I could prepare some remarks and submit it to the Committee for your review.

[The information referred to is located on p. 42.]

Mr. DAVIS. Okay. That would be fine. How do you think USDA can better help these beekeepers then? You just heard from Dr. Pettis that \$25 million may not be enough in his opinion. So it is not just about money. What can we do in this Committee to help you address this problem on the ground to leverage Federal funds or Federal opportunities with some of the opportunities that you discuss in your testimony and also that you discussed today?

Mr. CUMMINGS. Congressman, two areas, one of them would be a sustained and continued commitment to research on *Varroa* mite. Oh, boy, if that burden was lifted from our honeybee operation, it would make a tremendous difference. And then the second area would be the availability of forage which would be the CRP lands and a richer mix of flowering plants in those CRP mixes.

Mr. DAVIS. Excellent. I appreciate the responses. I have a couple minutes left, and as I see that I am winding down to the end, I want to give each of you a chance. Is there anything that this Committee hasn't asked you that you would like to address now? You

are welcome to use the rest of my time to do so. Going once, going twice. I yield—oh, Dr. Fischer.

Dr. FISCHER. Let me just say I haven't commented on the forage issue. Our industry also sees that as a tremendous need that we need more opportunities for beekeepers to place bees in good, quality habitat. Bees need food, shelter and water just like we do, and if we keep the bees healthy, they will resist some of these diseases better. And if we can control the mites, we will knock down the pathogen loads. Everything is intertwined. It is all intertwined.

Mr. DAVIS. Well, thank you, Dr. Fischer. Mr. LaMalfa, I see you took 10 minutes the first time. You need me to yield me the last minute?

Mr. LAMALFA. No, I am doing fine, sir. Thank you.

Mr. DAVIS. You sure? All right. Mr. Chairman, I yield back.

The CHAIRMAN. Are you sure about that?

Mr. DAVIS. Reset the clock. I got another 5 minutes. All right.

The CHAIRMAN. Gentlemen, I want to thank you for being here, and I know Mr. Schrader had to step out as well. I appreciate the fact-based approach in making sure that we have the science right to help resolve this problem. I think one of the key questions with regard to the oversight is making sure that the money that is going from the taxpayers, from the United States taxpayers, into this research is producing the results that is needed to help again generate the value of the crop, which means that it will have a return for everybody.

With that said, again, thank you for being here, and under the rules of the Committee, the record of today's hearing will remain open for 10 calendar days to receive additional materials and supplementary written responses from the witnesses to any questions posed by a Member. The Subcommittee on Horticulture, Research, Biotechnology, and Foreign Agriculture hearing is now adjourned.

[Whereupon, at 10:25 a.m., the Subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

SUBMITTED STATEMENT BY HON. AUSTIN SCOTT, A REPRESENTATIVE IN CONGRESS FROM GEORGIA ON BEHALF OF GENE HARRINGTON, VICE PRESIDENT, GOVERNMENT AFFAIRS, NATIONAL PEST MANAGEMENT ASSOCIATION

Chairman Scott, Ranking Member Schrader, and other Members of the Subcommittee, the National Pest Management Association (NPMA) appreciates the opportunity to submit testimony regarding the panel's hearing to review the current research and application of management strategies to control pests and diseases of pollinators.

Founded in 1933, NPMA is the only national trade group representing the interests of professional pest management companies. NPMA's 6,000 members manage countless residential pests such as ants, bed bugs, mosquitoes, rodents, stinging insects and termites in a myriad of residential, commercial and institutional settings.

We are taught early on that bees are beneficial insects. The value of insect pollination to U.S. agricultural production is estimated at \$16 billion annually; about $\frac{3}{4}$ of the value is attributable to honey bees. In light of how significant bees are to the ecosystem and to maintaining a diverse and healthy food supply, NPMA is a member and financial supporter of the Pollinator Partnership, a group devoted to the promotion of the health of pollinators through conservation, education, and research.

U.S. Department of Agriculture (USDA) estimates of over-winter bee colony losses have averaged more than 30 percent annually in recent years. (Since many beekeepers have been able to replace lost hives, overall honey bee colony numbers are stable.) Science suggests multiple factors for the decline in bee health including; parasites, diet and nutrition, lack of genetic diversity, habitat loss, beekeeping management practices, weather, and viruses. A 2013 joint USDA and U.S. Environmental Protection Agency (EPA) report found the *Varroa* mite as the "most detrimental pest of honeybees."

Some have unjustifiably singled out pesticides as the primary cause for the decline in bee health, focusing specifically on a class of pesticides known as neonicotinoids. As part of its periodic review of every pesticide, EPA is presently re-evaluating neonicotinoids to ensure they meet contemporary health and environmental standards. While the process is expected to last until 2018, EPA can impose use restrictions sooner, if the data warrants such action. In fact, last August, EPA amended language on neonicotinoid product labels to better safeguard bees from unintended exposure. The Agency is expected to issue a proposal later this year extending that language to all pesticide labels.

When used improperly, pesticides can indeed be harmful to bees. Pest management professionals (PMPs), however, have met their states' pesticide applicator licensing and certification requirements and are trained to apply pesticides according to label directions. The byproduct of EPA's evaluation of a pesticide's potential environmental and health hazards, labels are an extension of Federal and state pesticide law. Of course, bees can also be pests, infesting homes and threatening human health in certain situations. Consequently, PMPs are frequently contacted to manage such problems. It is standard practice for many PMPs to reach out to beekeepers to collect and recolonize honey bees they are called upon to control. In addition, an increasing number of PMPs are being beekeepers themselves, and they try to preserve the bees they encounter for their personal hives. Sometimes, however, treating bees with a pesticide is unavoidable.

When used according to the label, there has been no demonstrated negative effect on bee health associated with use of neonicotinoid insecticides. Moreover, the chairwoman of a major National Academy of Sciences study on the loss of pollinators recently said she was "extremely dubious" that banning neonicotinoids would have any positive effect.

In closing, NPMA urges Members of Congress to withhold support from measures that unfairly blame pesticides for the decline in bee health, overlooking the widespread science that shows this is an extremely complex issue with multiple factors involved. NPMA also urges Committee Members to join the Congressional Pollinator Protection Caucus (CP2C), a bipartisan group dedicated to protecting pollinators and their habitat.

SUBMITTED STATEMENT HON. JIM COSTA, A REPRESENTATIVE IN CONGRESS FROM CALIFORNIA ON BEHALF OF ALMOND HULLERS & PROCESSORS ASSOCIATION

May 5, 2014

Hon. JIM COSTA,
U.S. House of Representatives,

Washington, D.C.

Dear Rep. Costa:

Thank you for the opportunity to submit testimony to the recent hearing on research efforts to combat pests and diseases of pollinators on behalf of the Almond Hullers & Processors Association, the California almond industry's trade association. Our members represent 90 percent of the almond industry based on tonnage. The almond industry is California's third ranking agricultural crop with a farm gate value of \$4.3 billion in 2012. We are proud to say we are the number one California agricultural export and the number one specialty crop export for the United States. 2012 almond exports of \$3.4 billion created 47,000 jobs. California produces 80 percent of the world's almonds and 100 percent of the U.S. domestic supply.

Almonds are the largest crop that needs to be pollinated by bees and we are the first crop to bloom each year. For those reasons, the almond industry partners with beekeepers and bee researchers to protect this vital resource. This partnership is funded through the Almond Board of California (ABC). I would like to share with you that ABC has invested over \$2.2 million of almond grower dollars in bee health research since 1995. ABC key objectives today are to assure a sufficient supply of strong hives for almond pollination and to assure almonds continue to be a good and safe place for bees. To reach these objectives, ABC's primary research focus over the last several years has been honey bee health including nutrition, stock improvement, pest/disease management, and the impact of pesticides. Since 2000, ABC has funded 70 projects with key researchers throughout the United States. Current projects include:

1. Improving honey bee nutrition and forage throughout the year
 - a. Nutritional effects of protein supplements *vs.* natural forage in colonies used for almond pollination
 - b. Integrated crop pollination—supplemental forage in conjunction with almonds
2. *Varroa* mite (and other bee pests) control—breeding, new materials and management techniques
 - a. *Varroa* treatments: Efficacy and economic impact
 - b. Treatment thresholds: Enhancing tech transfer teams for the beekeeping industry.

Note: Tech Transfer Teams are experts who work with beekeepers and other pollinator stakeholders to provide disease and parasite management monitoring along with analysis so that beekeepers can make science-based decisions on what helps or hinders bee health. Over wintering bee losses for beekeepers working with a Tech Transfer Team average 17 percent, while the standard bee loss is 31 percent.
3. Stock improvement
 - a. Germplasm importation, preservation and stock improvement
4. Balancing the need for pest control materials, both in crops and in the hive *vs.* possible effects on live health
 - a. Fungicide effects on honey bee development
 - b. Impact of fungicide application on pollen germination and tube growth

In addition to ABC-funded research, the almond industry has successfully utilized the UC Cooperative Research and Extension programs that support staff and facilities for basic laboratory and field research as well as supporting applied research and Extension that moves basic research into commercial settings and helps communicate findings and recommendations developed through that research to the grower community. Continuing cuts in public funding for agricultural research are having a significant impact on the pool of skilled researchers available to carry out research projects. At UC Agricultural and Natural Resources (ANR) division, there has been a 40 percent decline in the number of "boots on the ground" Extension specialists and farm advisors from a peak of 300 farm advisors and 200 specialist in 1990 to 200 advisors and 100 specialists today.

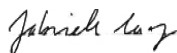
As these permanent budget cuts continue, private industry must be involved in securing research capacity at the basic and applied level to ensure California growers maintain their competitive edge.

The ABC is currently engaged in prioritizing future research needs for the industry and exploring ways to support research capacity through public and private partnerships.

To support research capacity, ABC is designating funds on an ongoing basis to cover start-up costs for Extension opportunities. For example, ABC is partnering with the California Pistachio Research Board to provide funding for the research and community outreach provided by a Farm Advisor/Specialist with the ANR for up to 6 years. Upon the completion of the 6 year probationary period, ANR would take over the funding. This collaborative approach is being overseen by the ABC Production Research Committee and allows ABC to advance commitments to this important program.

If you would like information about these projects or others ABC funds to benefit the almond industry, please let me know. Again, thank you for letting us participate in this discussion.

Sincerely,



GABRIELE LUDWIG,
Consultant to AHPA.

SUPPLEMENTARY MATERIAL SUBMITTED BY DR. JEFFREY S. PETTIS, RESEARCH LEADER, BEE RESEARCH LABORATORY, AGRICULTURAL RESEARCH SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Insert 1

Mr. DENHAM. Thank you, Mr. Chairman. Dr. Pettis, as you know California is experiencing a tremendous drought right now. Secretary Vilsack has stated that USDA is acting to mitigate the crop losses due to the drought. What types of challenges or loss do you expect to see with the honeybees?

Dr. PETTIS. Well, it is a challenging question. We have that survey under way right now, and we will have that figure May 6th. I do know for California specifically, this year, coming out of almonds, the keepers are normally there from January, February, into early March, and there are other things blooming in California. This past year there has been virtually nothing blooming in California due to the drought. So this particular year in California was unusual and that the bees had almonds and they had virtually nothing else.

So we talk about the Midwest as being important, the Dakotas and the Midwest, because that is where the bees summer. Sixty to 70 percent of the bees summer there, and then they go to California, but foraging California is critical as well. And I don't know where the loss figure will go this year.

The main effect of drought on bees is that it will reduce bee forage. This year, USDA Natural Resources Conservation Service (NRCS) gave farmers incentives to plant bee forage on their farms. This program was just initiated this year. Since 2008, ARS research has identified ways to better provide bee forage for honey bees and other pollinators that will be useful to the farmers in this program.

In addition, the 2014 USDA Crop Insurance program insures honey production losses related to low rainfall and its effects on bee forage. This should help mitigate financial losses felt by honey producers.

Insert 2

Mr. DENHAM. And do you know if USDA is planning anything to mitigate any loss or address any of the challenges that we are facing with our pollinators?

Dr. PETTIS. I would have to get back to you with specifics on whether we were looking at mitigating. I will say that this fall we are planning to hold a summit on forage that will look at forage issues this coming fall. But I don't know about mitigation. I have to get back to you on that.

Based on scientific evidence to date, the leading factors that are most likely interacting to cause pollinator decline are poor bee nutrition and habitat loss, parasitic mites and pathogens, transportation stress, and exposure to pesticides. Lack of diverse bee stock may also contribute to bee susceptibility. ARS has identified ways to better provide bee forage for honey bees and other pollinators. NRCS has initiated efforts to provide farmers incentives to plant bee forage on their farms.

One of the issues that has recently emerged concerns questions over the importance of sublethal effects of insecticides and fungicides on honey bee health. The extent to which bees are exposed to these pesticides throughout their lifecycle is being

assessed. In the last year, ARS has started research projects to evaluate better use of pesticides, such as to reduce bee exposures while still maintaining adequate crop protection.

USDA and the Environmental Protection Agency (EPA) are coordinating efforts to revise the CCD and Bee Health Action Plan and develop a National Recovery Plan for Honey Bees in response to the 2014 Presidential Memo on Pollinator Health. This will be accompanied by several listening and informational sessions nationwide. These efforts build on a National Stakeholder Workshop on Honey Bee Health held in 2012. The report for that workshop can be found at www.usda.gov/documents/ReportHoneyBeeHealth.pdf. A Bee Health Action Plan was developed to address needs identified by stakeholders at this workshop, and several Federal agencies are now working together to accomplish this work; the Federal agencies include eight USDA agencies (Agricultural Research Service (ARS), National Institute of Food and Agriculture (NIFA), Natural Resources Conservation Service (NRCS), Farm Service Agency (FSA), Animal and Plant Health Inspection Service (APHIS), National Agricultural Statistics Service (NASS), Forest Service (FS), and Economic Research Service (ERS)) and EPA.

The goals of this work are to:

- Accurately determine the pesticide exposure that bees receive in the field and the sub-lethal effects of pesticides on honey bees and colony productivity;
- Systematically implement Best Management Practices for pesticide use and develop strategies to enhance adoption of these practices;
- Greatly improve knowledge of bee nutrition and its impact on bee longevity since malnourished bees are more susceptible to stressors;
- Improve bee breeding stock; and
- Improve means of managing parasitic mites and diseases.

SUBMITTED LETTER BY ARTHUR DANIEL “DAN” CUMMINGS, CHIEF EXECUTIVE OFFICER, CAPAY FARMS; CHIEF FINANCIAL OFFICER, OLIVAREZ HONEY BEES, CHICO, CA

June 16, 2014

House Committee on Agriculture,
U.S. House of Representatives,
Washington, D.C.

Dear Committee Members:

Thank you for the opportunity to provide additional answers to questions raised at the hearing to review current research and application of management strategies to control pest and diseases of pollinators. Rep. Davis had requested ways in which the almond industry had leveraged programs funded through the farm bill to improve bee conditions.

Conservation Programs

Almond growers have availed themselves of funding from the Environmental Quality Incentives Program (EQIP) managed by the Natural Resources Conservation Service (NRCS) to help plant pollinator friendly plantings and hedgerows around their properties to help provide diverse forage for honey bees. Plantings have also been used to restore non-agriculture lands to provide bee habitat. The NRCS Plant Material Centers around the country have been extremely useful in helping to identify plant species that are regionally appropriate to plant for pollinator habitat. Thus, they play a critical role in improving forage for honey bees and pollinators.

Another program funded by the farm bill that is extremely important to beekeepers and the almond industry is the Conservation Reserve Program managed by USDA–FSA. While it is not directly utilized by the almond industry, the use of CRP lands in the Midwest is critical to ensuring good summer forage areas for commercial honey bees. The significant loss of acres due to increased corn and soybean prices, coupled with Congress’ cut in support for CRP acres, is seriously hurting honey bees due to loss of good forage opportunities during the summer months.

Research Programs

The Specialty Crop Block Grant program has been invaluable for funding. Project Apis M. has received funding for habitat creation around almonds. Also, funding from Specialty Crop Research Initiative (SCRI) grants via USDA–NIFA have gone to honey bee health or to pollinator health/habitat.

Also, I would be negligent if I did not mention the Bee Informed Partnership sponsored by USDA–NIFA. Funding for Tech Transfer Teams through this project has been critically vital in *Varroa* mite treatment and control. In 2012–2013, commercial beekeepers working with these teams experience 17% overwintering loss of hives where the average commercial beekeepers hive loss was 31%. Funding for this project ends in 2 years and alternate funding will need to be identified as this program is too important to lose. The Almond Board of California contributes funds for Tech Transfer Teams and is committed to the program and future funding. Partnerships with other industries should be pursued.

Finally, Rep. Costa had also asked a question regarding the effectiveness of research dollars that Congress provided in 2007 and 2012 for honey bee health and whether that research is sufficiently coordinated. I would like to address that question as well. The additional funding has been very helpful in learning more about honey bee health especially when it comes to diseases and pesticides. However, better coordination to improve honey bee/pollinator health research within USDA and universities would be beneficial. The large coordinated efforts such as the Bee Informed Partnership (mentioned above) or the Integrated Crop Pollination Project are examples of very successful coordinated efforts. Areas where improved coordination would help include *Varroa* mite and disease management as well as pollinator breeding (*e.g.*, queen breeders are not adopting USDA–ARS bred strains of bees). Also, currently there is too little coordination with EPA on any of the pesticide impact research. Most of the current work within USDA and universities is not usable in the regulatory context because it doesn't really help EPA assess what actions to take.

Again, thank you for letting me participate in the hearing. Should you have any further questions, I am happy to respond.

Sincerely,

DAN CUMMINGS.

SUBMITTED QUESTIONS

Response from Dr. Jeffrey S. Pettis, Research Leader, Bee Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture

Questions Submitted by Hon. Jim Costa, a Representative in Congress from California

Question 1. With the investments made on pollinator issues in both the 2008 and 2014 Farm Bills as well as other USDA programs, what has and hasn't worked?

Answer. The U.S. bee industry started to suffer high bee mortality rates in the mid-2000's due to a malady commonly called Colony Collapse Disorder (CCD). Like Alzheimer's, diabetes, and cancer in humans, CCD has turned out to be a very complex problem in honey bees, and despite significant findings and continued scientific research, we have not yet found the underlying cause. While CCD seems to be somewhat in decline, bee losses in total have stayed about the same, suggesting that the problem of bee loss is large and the solutions are difficult.

At the start, a major research barrier was the lack of any baseline data on honey bee colony health in the United States. Scientists still do not have any means for determining how current honey bee mortality rates compare with mortality levels before CCD, so U.S. Bee Loss Survey was established in 2008 to provide some data on the causes of bee losses, and from which to evaluate progress and measure success. This was run by the Apiary Inspectors of America for the first few years, and for the last 3 years, via a NIFA funded CAP grant to the University of Maryland. A Pest and Disease Survey is a separate, significant achievement that resulted from new funding provided for CCD research to APHIS, with scientific labor provided by ARS. Also, NASS is developing a strategy to survey colonies losses on a quarterly basis. A quarterly survey will provide better tracking of when and where mortality occurs, especially for migratory colonies. This project is not currently funded, but if funding is obtained, it could begin as early as April 2015.

Although over-winter losses in honey bee colonies have not declined significantly since the U.S. Bee Loss survey was initiated, scientists have made progress in addressing the problem. Four main areas have yielded results.

First, research on CCD has taught us that the availability of forage for pollinators is declining in this country, and that a diverse, high-quality forage is needed for honey bees to help them withstand multiple stressors (*e.g.*, disease, pests, pesticides). The U.S. Bee Loss Survey and research conducted by University and ARS researchers suggests that poor nutrition is affecting the ability of bees to survive the winter and deal with bee health issues. One recent finding is that pollen sub-

stitute protein does not provide, in itself, adequate nutrition for bees; pollen is needed as a supplement to any diet.

Second, scientists have found that bees are exposed to a far greater number of insecticides and fungicides than previously recognized, and many of these pesticides can persist in the hive. Before this research was conducted, we did not know the large extent to which these pesticides were permeating the bee lifecycle. New research also suggests that some of these pesticides may cause sublethal or long-term health effects, even at low concentrations. As a result, EPA is now including honey bees in its quantitative risk assessment for pesticide registrations, and will begin requiring a broader suite of tests, all of which collect information on sublethal effects on bees. EPA is also considering a quantitative tiered method of testing (both lab and field evaluations) that will capture both lethal and sublethal endpoints. This evolution in the regulatory process is new since 2008 and a direct result of research indicating that pesticides are one of the factors associated with declines. Also as a result of this research, ARS is now evaluating the use of pesticides in certain crops, such as vegetables, tree fruits and nuts, corn, cotton, and soybeans, to determine how pest control could be more efficiently achieved with regard to minimizing pollinator exposure to pesticides while still maintaining adequate crop protection.

The third main finding is that *Varroa* mite control is critical to improving honey bee survival rates and CCD. In particular, this common, but devastating parasite spreads viral pathogens, inhibits the honey bee immune system, and decreases the life span of honey bee adults. These pathogens can be fatal on their own, but the combination of viruses, the *Varroa* mite, and possibly other pathogens such as nosema, seem to exacerbate CCD and declines in honey bee health. The search for a virus that may cause CCD has also resulted in the development of an entirely new method for controlling pests and diseases in insects, a method based on RNAi technology. RNAi technologies are still in development, but this strategy may open up an entirely new way to develop pest control, a new approach that could create highly specific pest control compounds that should not harm the bees.

Fourth, U.S. honey bee colonies need increased genetic diversity. Genetic variation improves bee thermoregulation (the ability to honey bees to keep the hive warm), disease resistance, and worker productivity. Honey bee breeding should emphasize traits such as hygienic behavior that confer improved resistance to *Varroa* mites and resistance to diseases (such as American foulbrood).

Question 2. What can we do to better help solve CCD?

Answer. Pollinator health, of which CCD is an aspect, is a nationally important issue. In June 2014, President Obama issued a Memorandum in response to these serious issues. The Memorandum led to the establishment of a Pollinator Health Task Force, co-chaired by USDA and EPA, to coordinate government actions needed to improve pollinator health. As part of this coordinated effort to understand and mitigate pollinator decline, throughout USDA and other Federal partners, ARS has proposed a \$4 million increase for pollinator health research in fiscal year 2015. A portion of these funds will be used for bee research at an existing ARS laboratory in California, a state that requires the use of over ½ of the nation's bees to provide pollination services to almonds and other tree fruit crops. Other research will be directed to protect bees from mites and diseases using novel gene silencing (RNAi) strategies, mitigating losses from pesticides and other environmental stressors such as overwintering, and to develop forage seed mixes for bee nutrition. Other USDA programs, such as the National Agricultural Statistics Service (NASS), the National Institute of Food and Agriculture (NIFA) and the Farm Service Agency's (FSA) Conservation Reserve Program (CRP) have proposed significant increases. In December 2014 a Report is due to the President to describe the actions being taken by Federal agencies in response to the Memorandum.

Question 3. Is the Federal funding used like it should be?

Answer. Yes. USDA and other Federal agencies are exploiting the best science available to address this issue, based on customer workshops and scientists input, and detailed in the CCD Action Plan. This Action Plan is under revision to include recent input from a *Varroa* Summit in 2014 and a Honey Bee Forage and Nutrition Summit in October 2014. We rigorously review and assess our research priorities for pollinator health continuously in close collaboration with stakeholders, members of the scientific community, and other Federal agencies.

The Environmental Protection Agency (EPA) and USDA have compiled a Pollinator Road Map, which outlines past and planned activities to address CCD and other pollinator health issues.

At the request of beekeepers, commodity growers, and pesticide manufacturers, ARS hosted a *Varroa* Summit in February 2014 to assess *Varroa destructor* (mite) control and effects on bee health. Presentation of several innovative research results

included the development of genomic technologies, such as RNAi, and more conventional control measures, to control this serious parasitic mite.

The Federal CCD Steering Committee hosted a customer/stakeholder meeting in October 2012, which provided input to the CCD Action Plan that is being updated for the 2014–2018 period. The focus of the Action Plan will change from CCD alone to CCD and bee health. The USDA Deputy Secretary organized a USDA Pollinator Working Group that met in March 2014.

Beekeepers and growers also requested that USDA host a Honey Bee Forage and Nutrition Summit, and that summit was just recently held on Oct. 20–21, 2014, in Alexandria, Virginia.

