

*E-mailed from the*

ASSEMBLY COMMITTEE ON  
**ENVIRONMENTAL SAFETY AND TOXIC MATERIALS**

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To: Members of the Assembly Committee on Environmental Safety & Toxic Materials and the Assembly Committee on Agriculture

From: Assemblymember Luis Alejo and Assemblymember Eggman

Subject: Oversight Hearing on finding solutions to the Bee Colony Collapse Disorder

The Assembly Environmental Safety and Toxic Materials Committee and the Assembly Agriculture Committee will be holding a joint oversight hearing on Wednesday, October 16, 2013, focusing on the bee colony collapse disorder (CCD) in California. The hearing will be held at the State Capitol, room 4202, in Sacramento, from 2pm to 4pm.

The Committees will be hearing from researchers, state agency, commodity groups, farmers, beekeepers and others to identify those additional steps needed to protect California bees and agriculture. The Committee will seek answers from the witnesses about the habitat protection, bee colony health, and factors affecting long term improvement. Among the specific issues of concern are:

- 1) What is the current available hive supply and trends of the bee population in California?
- 2) What are the economic effects of impaired pollination on California's agricultural industry?
- 3) What environmental impacts on bee colony health can be improved with regulatory actions and through best management practices by agriculture and beekeepers?
- 4) Can the State of California provide for a more robust bee population – what are the elements of such a plan and how can the State provide leadership?
- 5) What practices by agriculture, environmental organizations and the state are needed to improve the habitat for bee population and will that reduce declines from Bee Colony

## Collapse Disorder?

- 6) What practices by beekeepers would improve the hive health and ensure available pollination for those dependent crops?

### **Background**

Many California commodities benefit from bee pollination; while some are dependent upon bee pollination, others do not need pollinators and may be harmed if pollinated. Those crops dependent upon bee pollination, also depend upon the services provided by commercial beekeeper operators from inside and outside of the state. The importance of these operators' hives being healthy and vibrant is critical to the crop being pollinated. The most important tree crop users of pollination services include almond, apple, avocado, cherry, kiwi, pear, and prunes/plums. Other important California crops using pollination services include alfalfa seed, cucumbers, melons (cantaloupes, honeydew, and watermelons), sunflowers, and vegetable seeds.<sup>1</sup>

California had 740,000 acres of bearing almond trees in 2010, which produced about 80% of the world's almonds. Approximately 70% of almond production is exported, making almonds California's largest-value agricultural export. Almonds are also California's largest user of pollination services. Estimates place 60% of all U.S. bee colonies being used for pollination in California almond orchards during the bloom period of February/March. After the almond bloom, the hives move on to other crops with a typical hive being rented two to three times during the season.

The number of managed honey bee colonies has dropped from five million in the 1940s to only 2.5 million today. At the same time, the need for hives to supply pollination services has risen. Bee colonies are trucked farther and more often than in the past.

### **Bee Colony Collapse Disorder (CCD)**

Bee colony health has been declining since the 1980s. The spread into the United States (US) of varroa and tracheal mites, in particular, created major new stresses on honey bees. Other stressors include loss of available habitat with a rich mix of nutritional pollens, inability of the bee immune system to protect it from disease, lack of genetic diversity, toxic plant pollens and pesticides.

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<sup>1</sup> Carman, Hoy. 2011. "The Estimated Impact of Bee Colony Collapse Disorder on Almond Pollination Fees." *ARE Update* 14(5): 9-11. University of California Giannini Foundation of Agricultural Economics.

Beginning in October 2006, some beekeepers began reporting losses of 30-90% of their hives. While colony losses are not unexpected during winter weather, the magnitude of loss suffered by some beekeepers was highly unusual. This phenomenon has been termed CCD. The main symptom of CCD is a hive that includes all of the following: 1) No, or a low number, of adult honey bees present in the hive; 2) A live queen in the hive; and, 3) No dead honey bees in the hive. Often there is still honey in the hive and immature bees are present.

### **US Department of Agriculture (USDA) – report on CCD.**

In October 2012, a National Stakeholders Conference on Honey Bee Health, led by federal researchers and managers, along with Pennsylvania State University, was convened to synthesize the current state of knowledge regarding the primary factors that scientists believe have the greatest impact on managed bee health<sup>2</sup>.

- 1) The parasitic Varroa mite is recognized as the major factor underlying colony loss in the United States and other countries. There is widespread resistance to the chemicals beekeepers use to control mites within the hive. New virus species have been found in the United States, several associated with Colony Collapse Disorder.
- 2) U.S. honeybee colonies need increased genetic diversity. Genetic variation improves bees' ability to keep body temperature steady even if the surrounding environment is different, as well as, disease resistance and worker productivity.
- 3) Honey bee breeding should emphasize traits such as hygienic behavior that confer improved resistance to Varroa mites and diseases such as American foulbrood.
- 4) Nutrition has a major impact on individual bee and colony longevity. A nutrition-poor diet can make bees more susceptible to harm from disease and parasites. Bees need better forage and a variety of plants to support colony health.
- 5) Federal and state partners should consider actions affecting land management to maximize available nutritional forage to promote and enhance good bee health and to protect bees by keeping them away from pesticide-treated fields.
- 6) Best Management Practices associated with bees and pesticide use, exist, but are not widely or systematically followed by members of the crop-producing industry. There is a need for informed and coordinated communication between growers and beekeepers and effective collaboration between stakeholders on practices to protect bees from pesticides.
- 7) Beekeepers emphasized the need for accurate and timely bee kill incident reporting, monitoring, and enforcement.

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<sup>2</sup> USDA, [Report on the National Stakeholders Conference on Honey Bee Health](http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf), National Honey Bee Health Stakeholder Conference Steering Committee, May 2013, <http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf>.

## **California Department of Pesticide Regulation (DPR)**

Any new active ingredient must first be registered federally by the US Environmental Protection Agency (EPA) before we can register it in California. Normally, before the US EPA registers a new active ingredient, it conducts a full risk assessment.

Of the possible causes of CCD being examined, one that has become the subject of debate is whether certain chemicals or combinations of chemicals could be contributing more to CCD than others, including certain pesticides and possibly some fungicides. There has been a concern that certain pesticides may have sub-lethal effects on bees, not killing them outright but instead impairing their development and behavior.

One class of insecticide being studied are neonicotinoids, which contain the active ingredient imidacloprid, and similar other chemicals, such as clothianidin and thiamethoxam. These neonic active ingredients were conditionally registered at US EPA because they were seen as more benign alternatives to the organophosphate chemicals they were replacing.

Current law requires DPR to continually evaluate all registered pesticides to ensure their safe and effective use. DPR may initiate reevaluation if they receive information that the use of a pesticide may have caused or is likely to cause an adverse effect to people or the environment, or if they find that a significant adverse impact has occurred or is likely to occur.

### **Neonicotinoids**

There are currently four neonicotinoid chemicals being reviewed for potential impacts to honey bees, all of which are registered for use in California. These include the active ingredients imidacloprid, clothianidin, dinotefuran and thiamethoxam.

In February 2009, DPR initiated a reevaluation of 282 pesticide products based on concerns regarding possible adverse effects on honey bees. In addition to products containing the active ingredient imidacloprid, DPR also placed products containing the active ingredients clothianidin, dinotefuran and thiamethoxam into reevaluation. These chemicals all belong to the same chemical family. Based on available data, DPR scientists thought that these active ingredients would have the same potential residue concerns as imidacloprid. Data also indicated that the active ingredients were similar in toxicity to honey bees.

For products containing thiamethoxam, DPR has required residue data on cucurbits (gourds), fruiting vegetables, and strawberries. DPR is also requiring the registrant to conduct two-year prescriptive monitoring studies representing a worst-case scenario in almonds, citrus, cotton, and stone fruit. For products containing clothianidin, DPR required residue data on pome fruits. Also, in June 2012, DPR reviewed and approved a protocol for a two-year prescriptive

monitoring study representing a worst-case scenario in cucurbits.

The results of these studies will help develop the mitigation measures DPR may require to be used to minimize any adverse effects to honey bees. However, until the science gives us a clear picture of what effect these pesticides are having, we are shooting in the dark. After DPR initiated its reevaluation, imidacloprid registrants elected to remove almonds from their labels. Thiamethoxam followed in December of 2012.

DPR has requested studies looking at residues of the four active ingredients in pollen and nectar resulting from applications to soil and by foliar application. DPR is continuing to look at the role neonics may play in future bee mortality events and what other pesticides and factors might cause bee deaths in CA.

Table 1. Neonicotinoid Reported Use in California  
2009 – 2011

<b>Ag/Non-ag</b>	<b>CHEMNAME</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Ag</b>	CLOTHIANIDIN	1,765	3,111	31,412
	DINOTEFURAN	8,367	7,354	5,854
	IMIDACLOPRID	162,799	209,558	249,431
	THIAMETHOXAM	7,762	7,326	11,429
<b>Ag Total</b>		<b>180,692</b>	<b>227,348</b>	<b>298,126</b>
<b>Non-Ag</b>	CLOTHIANIDIN	604	184	171
	DINOTEFURAN	59	465	331
	IMIDACLOPRID	32,652	57,461	42,860
	NITHIAZINE	0	0	0
	THIAMETHOXAM	14,154	7,770	6,187
<b>Non-Ag Total</b>		<b>47,469</b>	<b>65,880</b>	<b>49,548</b>
<b>Grand Total</b>		<b>228,161</b>	<b>293,229</b>	<b>347,675<sup>3</sup></b>

<sup>3</sup> Pounds of nitroguanidine neonicotinoid active ingredients that are of concern, applied in California from 2009 to 2011. Use is given for agricultural applications ("Ag") and all other uses, which are mostly urban applications ("Non-ag"). The non-ag uses include only applications made by commercial applicators and not consumer products. This only includes those used by pest control businesses hired to apply pesticides for home and commercial. Data from DPR's Pesticide Use Reporting database 9/26/2013.

On August 15, 2013 the US EPA released new pesticide label requirements for neonicotinoid pesticides that further restrict their use where bees and other pollinators are present. Manufacturers of pesticides were ordered to immediately (by Sept. 30, 2013) change their labeling.

New labels will be required for pesticides including imidacloprid, dinotefuran, clothianidin and thiamethoxam, and will contain a new label dubbed, "Protection of Pollinators" and a bee hazard icon that provides information on varying exposure and spray drift precautions.

### **Beekeepers' Referendum on Apiary Research Commission**

The California Beekeepers Association approached the Legislature with this idea after Colony Collapse Disorder began causing significant losses of bees. The California Apiary Research Commission was enacted into law on January 1, 2011, via the passage of AB 1912 (Evans, Chapter 585, Statutes of 2010) but like all other proposed commissions, an approval by a super-majority of the industry was required before the program could become operative.

The proposed commission would have established an assessment on beekeepers operating more than 50 colonies of bees in California to fund research and education regarding issues that affect the apiary industry. The assessable universe included both beekeepers who reside in California and beekeepers whose principle residence is outside of the state, but who bring bees into California for commercial purposes.

In a 2011 referendum conducted by the Marketing Branch of the California Department of Food and Agriculture, beekeepers voted against implementation of the proposed California Apiary Research Commission. 40 % of beekeepers cast their ballot in favor of the commission; however, those ballots accounted for only 40 % of the voted beehive volume. While the participation requirement was met, there was not a sufficient level of support among beekeepers for implementation of the commission.