Protecting Pollinators: Stopping the Demise of Bees

Citing no evidence after using a flawed study, EPA protects polluters not the environment

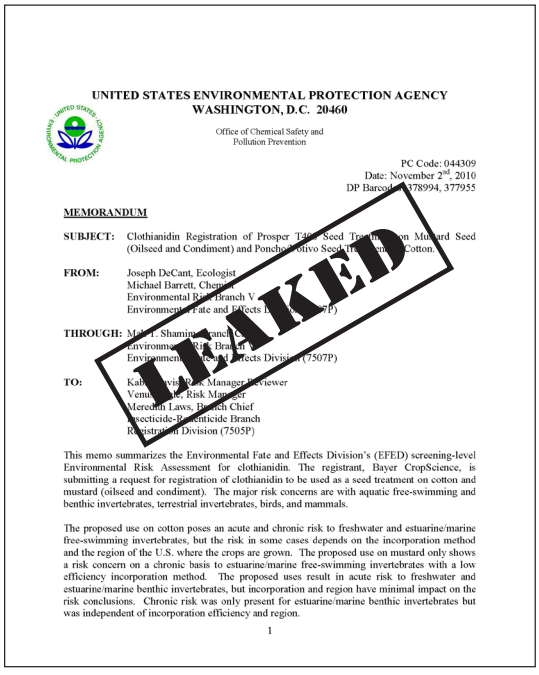
By Jay Feldman and Nichelle Harriott

An internal EPA memo, leaked to the beekeeping community from an undisclosed source at the U.S. Environmental Protection Agency (EPA) in December 2010, shines a spotlight on a key deficiency in the agency's efforts to protect honeybees. With the high percentage of disappearing bees (cited to be at 30 percent) and the collapse of their very social hive community, known as Colony Collapse Disorder (CCD), hitting the front pages of news organizations, the leaked internal memo from the science division of EPA's Office Pesticide Programs sent shock waves through organizations tracking bee health. After all, bees, as essential pollinators to food production, are a critical protector of life and the bellwether of environmental health.

How could it be that the central study on honeybee protection is flawed for purposes of EPA registration –core data required by EPA when it issued a 2003 conditional registration for a pesticide, clothianidin, known to be highly toxic to bees in the neonicotinoid family of chemicals that has been linked to CCD by many scientists and governments across Europe? How could it be that when EPA discovered the flawed study for this pesticide, it continued to allow its widespread use?

The Seriousness of the Problem

Approximately 90 percent of all flowering plants require pollinators to survive. In agriculture, nearly a third of pollination is accomplished by honeybees. Cucumbers, almonds, carrots, melons, apricots, cherries, pears, apples, prunes, plums, cantaloupe, onions, avocados, kiwi, blueberries, cranberries and more depend on honeybee pollination. Meat, milk and cheese production are reliant on pollinated crops that livestock eat. The disappearance of the bees identifies a fundamental and systemic flaw in the approach to the use of toxic chemicals, and highlights the question as to whether the current regulatory approach will slowly but surely cause a growing public health threat unless there is a meaningful change of course.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Office of Chemical Safety and Pollution Prevention

PC Code: 044309
Date: November 2nd, 2010
DP Barcode: 378994, 377955

MEMORANDUM

SUBJECT: Clothianidin Registration of Prosper T400 Seed Treatment on Mustard Seed (Oilseed and Condiment) and Poncho/Votivo Seed Treatment on Cotton.

FROM: Joseph DeCant, Ecologist
Michael Barrett, Chemist
Environmental Risk Branch V
Environmental Fate and Effects Division (7507P)

THROUGH: Mah T. Shamim, Branch Chief
Environmental Risk Branch V
Environmental Fate and Effects Division (7507P)

TO: Kathryn Davis, Risk Manager Reviewer
Venus Eagle, Risk Manager
Meredith Laws, Branch Chief
Insecticide-Rodenticide Branch
Registration Division (7505P)

LEAKED

This memo summarizes the Environmental Fate and Effects Division's (EFED) screening-level Environmental Risk Assessment for clothianidin. The registrant, Bayer CropScience, is submitting a request for registration of clothianidin to be used as a seed treatment on cotton and mustard (oilseed and condiment). The major risk concerns are with aquatic free-swimming and benthic invertebrates, terrestrial invertebrates, birds, and mammals.

The proposed use on cotton poses an acute and chronic risk to freshwater and estuarine/marine free-swimming invertebrates, but the risk in some cases depends on the incorporation method and the region of the U.S. where the crops are grown. The proposed use on mustard only shows a risk concern on a chronic basis to estuarine/marine free-swimming invertebrates with a low efficiency incorporation method. The proposed uses result in acute risk to freshwater and estuarine/marine benthic invertebrates, but incorporation and region have minimal impact on the risk conclusions. Chronic risk was only present for estuarine/marine benthic invertebrates but was independent of incorporation efficiency and region.

1

A Call for EPA to Stop Use

The disclosure rallied beekeeping and environmental organizations to request that EPA take immediate action to remove clothianidin from the market until it could get the data it needed to say for sure that bee health was not being adversely affected by this chemical. A letter to EPA in December 2010 called for immediate action:

"In light of new revelations by your agency in a November 2, 2010 memorandum that a core registration study for the insecticide clothianidin has been downgraded to unacceptable for purposes of registration, we are writing to request that you take urgent action to stop the use of this toxic chemical. Clothianidin is a widely used pesticide linked to a severe and dangerous decline in pollinator populations. As we are sure you appreciate, the failure of the agency to provide adequate protection for pollinators under its pesticide registration program creates an emergency with imminent hazards: Food production, public health and the environment are all seriously threatened, and the collapse of the commercial honeybee-keeping industry would result in economic harm of the highest magnitude for U.S. agriculture."

The letter continues: "The debate on clothianidin and the neonicotinoid pesticides is not new to the agency, but the recognition of the past failure of the Office of Pesticide Program's (OPP) 2007 scientific review, now acknowledged, requires immediate action to stop use while new studies are conducted. We refer you to

the memorandum entitled "Clothianidin Registration of Prosper T400 Seed Treatment on Mustard Seed and Poncho/Votivo Seed Treatment on Cotton," November 2, 2010 (see pp. 2, 4). The science that the agency has, and the independent literature find that clothianidin-contaminated pollen and nectar presents an imminent hazard. Because the hazards to honeybee health are present within registered use parameters, it is clear that label changes alone will not offer adequate protection. The issue is not one of application error, in other words. We therefore urge the agency to issue a stop use order immediately. Our nation cannot afford, and the environment cannot tolerate another growing season of clothianidin use."

The Regulatory History

When EPA issued a conditional registration for clothianidin in 2003, it established a requirement for a field study that it considered core and essential to a determination allowing full and continued registration of the chemical. EPA develops requirements such as these in accordance with guidance when determined necessary. In this case, as EPA stated in 2003, "**The possibility of toxic chronic exposure to nontarget pollinators through the translocation of clothianidin residues in nectar and pollen has prompted EFED** [Environmental Fate and Effects Division] **to require field testing** (141-5) that can help in evaluating this uncertainty. In order to fully evaluate the possibility of this long term toxic effect, **a complete worker bee life cycle study must be conducted**. . ." At this point, the study requirement became "core" to the registration.

EPA accepted the required study from clothianidin's manufacturer, Bayer AG, in November 2007. In the leaked November 2010, however, EPA changed its position on this "core" study, stating that, "A previous field study (MRID 46907801/46907802) investigated the effects of clothianidin on whole hive parameters and was classified as acceptable. However, after another review of this field study in light of additional information, deficiencies were identified that render the study supplemental. **It does not satisfy the guideline 850.3040, and another field study is needed to evaluate the effects of clothianidin on bees through contaminated pollen and nectar**." It became clear in that document that the "required" study for "Honey Bee Field Testing for Pollinators" is not acceptable to support the registration of clothianidin, and as a result "more data is needed," according to the memo. While the study may contain "some" useful information, as stated by EPA, it does not contain "required" information necessary to registration and the protection of bees from a systemic pesticide that moves through the treated plant.

According to beekeeper Jeff Anderson, who has communicated with EPA on the topic, "The Bayer study is fatally flawed. It was an open field study with control and test plots of about two acres each. Bees typically forage at least two miles out from the hive, so it is likely they didn't ingest much of the treated crops. And corn, not canola, is the major pollen-producing crop that bees rely on for winter nutrition. This is a critical point because we see hive losses mainly after over-wintering, so there is something going on in these winter cycles. It's as if they designed the study to avoid seeing clothianidin's effects on hive health."

At the time that EPA issued the conditional registration for clothianidin, it said this: "This compound is toxic to honey bees. The persistence of residues and the expression of clothianidin in nectar and pollen suggest the possibility of chronic toxic risk to honey bee larvae and the eventual stability of the hive." (Risk Assessment Addendum, EFED, EFA, 2003)

Finding the Factors Contributing to CCD

The issue here is not whether one can identify one pesticide as the cause of CCD. That claim has not been made. The beekeeper-environmentalist alliance believes that, in a period where CCD has ravaged bee colonies with losses up to 30% of hives, it is critical that EPA, under its statutory mandate, prohibit the use of a pesticide without "required" data that enables the agency to answer a central question relating to the health of honeybees.

In the world of research on bees in the U.S., scientists have linked a constellation of factors, including pesticides, parasites and viruses

to adverse impacts on bee health. Some have gone as far as saying that pesticides, especially systemic pesticides, like clothianidin, that are taken up by the plant and translocated through the organism including its pollen, are most certainly contributing to poor health in bee populations and increasing vulnerability to other threats. Countries in Europe, including France, Germany, Italy, and Spain, have taken this information and chosen to err on the side of safety and ban the neonicotinoid pesticides.

EPA, on the other hand, defends its inaction. Despite its acknowledgment that the study on which it relied to register the pesticide is inadequate, it maintains that it has no evidence that the pesticide adversely affects bees. Beekeepers and environmentalists ask, how could the agency have the evidence it says it needs to act if the study on which it relied does not meet its own standards. In responding to the coalition of beekeepers and environmentalists that has called on EPA to remove the pesticide from the market until it gets adequate information to make an informed and regulatory-compliant decision, the agency said:

"At this time, we are not aware of any data that reasonably demonstrates that bee colonies are subject to elevated losses due to chronic exposure to this pesticide. Based on EPA's thorough review of the scientific information, EPA does not intend at this time to initiate suspension or cancellation actions against the registered uses of clothianidin. . . Given the concern about the neonicotinoid class of pesticides and protection of bees, the Agency has also accelerated scheduling the comprehensive re-evaluation of these pesticides in the registration review program. EPA's registration review docket for clothianidin will open this year. We are coordinating re-evaluation of the neonicotinoid insecticides with California's Department of Pesticide Regulation and Canada's Pest Management Regulatory Authority."

Among the more baffling elements of the current situation are EPA's own documents, which acknowledge the problem, but allow business as usual. EPA's factsheet states, "Clothianidin is highly toxic to honey bees on an acute contact basis (LD50 > 0.0439 µg/bee). It has the potential for toxic chronic exposure to honey bees, as well as other nontarget pollinators, through the translocation of clothianidin residues in nectar and pollen. In honey bees, the effects of this toxic chronic exposure may include lethal and/or sub-

Clothianidin, Imidacloprid and other Neonicotinoids

Neonicotinoids are a class of insecticides that share a common mode of action that affect the central nervous system of insects, resulting in paralysis and death. They are systemic pesticides, taken up by the plant's vascular system and expressed through pollen and nectar, highly toxic to bees, and include imidacloprid, acetamiprid, clothianidin, dinotefuran, nithiazine, thiacloprid and thiamethoxam.

- **Clothianidin** is moderately toxic and is linked to immune effects in lab animals. It is highly toxic to bees and certain aquatic organisms, as well as birds, wild mammals and other non-target organisms.
- **Dinotefuran** has a low acute toxicity, but is a moderate eye irritant. It is linked to adverse effects on the nervous and immune systems, and is a reproductive toxicant.
- **Imidacloprid** is moderately toxic and is linked to reproductive and mutagenic effects. It has been found to be highly toxic to bees and other beneficial insects. It is also toxic to upland game birds, is generally persistent in soils, and can leach to groundwater.
- **Thiacloprid** is slightly to moderately toxic and is used on crops, cotton and fruits. It is classified as a 'likely' human carcinogen, based on increased incidence of uterine, ovarian and thyroid tumors in exposure studies.
- **Thiamethoxam** is liked to reproductive effects and liver damage and can potentially leach to groundwater.

Chronology of a core required study for the bee toxicant clothianidin, 2003-2010

EPA acknowledges clothianidin is toxic to bees, 2003.

- "The possibility of toxic chronic exposure to nontarget pollinators through the translocation of clothiandin residues in nectar and pollen has prompted [EPA] to require field testing… In order to fully evaluate the possibility of this long term toxic effect, a complete worker bee life cycle study must be conducted, as well as an evaluation of exposure to the queen."
- The agency suggests label language to read: "This compound is toxic to honey bees. The persistence of residues and the expression of clothianidin in pollen and nectar suggests the possibility of chronic toxic risk to honey bee larvae and the stability of the hive."

The study requirement identified as contingent to registration, 2003.

- Given the available information it was concluded,"..after further consideration, EFED would like to suggest that the registrant be given conditional registration that is contingent on their conducting the chronic honey bee study that evaluates the sublethal effects of clothianidin to the hive over time."
- In its *Clothianidin Pesticide Registration Factsheet*, EPA states, "Clothianidin is highly toxic to honey bees on an acute contact basis...It has the potential for toxic chronic exposure to honey bees, as well as other nontarget pollinators, through the translocation of clothianidin residues in nectar and pollen. In honey bees, the effects of this toxic chronic exposure may include lethal and/or sub-lethal effects in the larvae and reproductive effects in the queen."

EPA accepted Bayer's study, November 2007.

- EPA accepted the following study: Cutler, C. 2006. An Investigation of the Potential Long Term Impact of Clothianidin Seed Treated Canola on Honey Bees, Apis mellfeva L.

"This study was submitted to provide data on the toxicity of clothianidin to honeybees in a field test for the purpose of chemical registration (new use)… Bayer Cropscience was asked to investigate the long-term toxicity of clothianidin-treated canola to foraging honey bees."

EPA changed its position on the "core" study, toxic effects remain unevaluated, November 2010.

- "A previous field study... investigated the effects of clothianidin on whole hive parameters and was classified as acceptable. However, after another review of this field study in light of additional information, deficiencies were identified that render the study supplemental. It does not satisfy the guideline 850.3040, and another field study is needed to evaluate the effects of clothianidin on bees through contaminated pollen and nectar. Exposure through contaminated pollen and nectar and potential toxic effects therefore remain an uncertainty for pollinators."

lethal effects in the larvae and reproductive effects in the queen."

This corresponds with data from independent studies, as well as beekeeper observations in the real world. Therefore, the question remains, why is this chemical still allowed to threatened pollinators upon which so much relies?

Solutions Are Within Our Reach

Solutions to the loss of bees and human productivity are clearly within our reach if we engage our communities and governmental bodies. A little outrage will help. The shift to organic practices is not a fade but a necessity that is protective of health and the environment, sustainable and cost effective. The bees should serve as a warning because our very existence depends on theirs. The bees are telling us that lack of urgent action will lead to their demise...as well as our own.

Take Action:

You can email EPA Administrator Lisa P. Jackson directly to tell her you support the ban of clothianidin: jackson.lisa@epa.gov. Be sure to also send a copy (CC) to Steve Owens (owens.steve@epa.gov), Assistant Administrator for the Office of Chemical Safety and Pollution Prevention, and Steve Bradbury, bradbury.steven@epa.gov, Director of EPA's Office of Pesticide Programs.

See Beyond Pesticides bee webpage, www.beyondpesticides.org/pollinators, and organic practices and policies webpage, www.beyondpesticides.org/organicfood.

Do We Have A PESTICIDE BLOWOUT?

Clothianidin is agriculture's Deep Water Horizon

By Tom Theobald

Editor's note: *The following are excerpts from "Do We Have a Pesticide Blowout," by Tom Theobald, published in the July 2010 issue of Bee Culture, the Magazine of American Beekeeping. Mr. Theobald is owner of Niwot Honey Farms and a member of the Boulder County (Colorado) Beekeepers Association.*

America's farmland is awash in questionable chemicals as surely as the shorelines of the Gulf Coast are awash in crude oil – and for many of the same reasons.

I doubt that there are many readers who have escaped reports of the oil well blowout - the explosion and collapse of the Deepwater Horizon drilling platform and the subsequent environmental disaster that has ensued.

Evidence is mounting that the blowout of the Deepwater Horizon was brought on by a climate of lax oversight by the federal agency responsible for "insuring the safety and environmental protection of offshore drilling operations," the Mineral Management Service, or MMS. As I've listened to the news and read the articles describing events leading up to the explosion I'm struck by the parallel to what has been occurring in the beekeeping world over the past several years.

In May of 2008 there were massive bee kills in the Baden-Wurttemberg region of Germany, with two thirds of the colonies there killed. The damage was quickly traced to one of the pesticides in the controversial family of neonicotinoids produced by the German corporation Bayer. Planting of corn seed coated with clothianidin, by way of pneumatic planters, supposedly resulted in fugitive clothianidin dust which caused the disaster. Within two weeks Germany banned clothianidin on corn and several other crops, but the damage was done.

The German bee kill came as no surprise to the beekeeping community, which had been concerned about clothianidin since its registration in the U.S. in 2003, and in Germany in 2004. For four years those concerns were met with repeated assurances of safety, until finally disaster struck in Germany. Even in the aftermath of this huge bee kill the assurances continued. Bayer's explanation was that the bee kill was caused by ". . . an application error by the seed company which failed to use the glue-like substance that sticks the pesticide to the seed . . . It is an extremely rare event and has not been seen anywhere else in Europe . . ." This is reminiscent of the finger pointing in the oil industry.

What are we to do with circumstances like these? It is simply nuts, and yet this bogus science has now been used as justification to approve the use of clothianidin on a rapidly growing roster of other crops while there is mounting evidence of problems coming from around the globe. The EPA still seems to lack any sense of urgency and says it will not review clothianidin until 2012.

I still believe that most of the working level people at the EPA want to do things right, but there seems to be a serious management failure and nobody seems to be stepping in to get the ship back on course. Some very spooky chemicals are coming onto the market without proper testing and once out are virtually unregulated. We are seeing the legacy of more than a decade of deregulation and self regulation and it has not worked.

Read the full article on the Boulder County Beekeepers Association website, http://bit.ly/pesticide-blowout.