Groups to EPA: Ban bee-killing pesticide

Agency begins process of reviewing the neonicotinoid pesticide clothianidin

photo by Ines Boehnert

Over 250 organizations and businesses joined with Beyond Pesticides in February 2012 to urge the U.S. Environmental Protection Agency (EPA) to ban the bee-killing pesticide clothianidin. The public comments, submitted as part of the agency's pesticide review process, cite numerous scientific studies and call on EPA to take swift action and cancel the chemical's registration. The groups believe that because this pesticide is toxic to honey bees and wild pollinators, and has not been properly evaluated in field studies as required by EPA, it should be banned.

Clothianidin is in the neonicotinoid family of systemic pesticides, which are taken up by a plant's vascular system and expressed through pollen, nectar, and gutation droplets from which bees forage and drink. Scientists are concerned about the mix and cumulative effects of the multiple pesticides bees are exposed to in these ways. Neonicotinoids are of particular concern because they have sublethal effects on insect pollinators that correspond to symptoms of honey bee colony collapse disorder (CCD) –namely, neurobehavioral and immune system disruptions.

Clothianidin has been on the market since 2003. With a soil half-life of up to 19 years in heavy soils, and over a year in the lightest of soils, commercial beekeepers are concerned that even an immediate stop-use of clothianidin will not save their livelihoods or hives in time.

Comments Challenge Pesticide Registration

Beyond Pesticides, in its comments, states, "Honey bees are the most economically valuable pollinator worldwide, and many high-value crops, such as almonds and broccoli, are entirely reliant upon pollination services by commercial beekeepers and their honey bees. Globally, 9.5% of the total economic value of agricultural production for human consumption comes from insect pollination –in 2005, this amounted to just under $200 billion. However, each year since 2006 commercial beekeepers have reported annual losses of 29-36%. Such losses are unprecedented, and approximately double what is considered normal. Groups are calling on EPA to take action against the neonicotinoid class of chemicals, like in France, Germany, and other European countries. Clothianidin and thiamethoxam [a neonicotinoid precursor that converts to clothianidin in plants and animals] are not only extremely persistent in the environment, but they are highly toxic to bees and other non-target insects. Clothianidin's use as a systemic pesticide means that every part of the plant is potentially toxic to the honey bee, and can result in widespread contamination of soil and wild plants. Risks posed by clothianidin and other neonicotinoids have been underestimated by the agency, especially given the outstanding honey bee data that have yet to be adequately reviewed. In light of the agency's mandate in Section 3(c)(7)(A) of [the Federal, Insecticide, Fungicide, and Rodenticide Act (FIFRA)] to ensure that pesticides do not pose unreasonable adverse effects on the environment, clothianidin and its parent thiameth-

oxam should be cancelled."

Clothianidin's Toxicity to Honey Bees

Clothianidin, like other neonicotinoids, is an insecticide that is highly toxic to a range of insects, including honey bees and other pollinators. It is particularly dangerous because, in addition to being acutely toxic in high doses, it also results in serious, though sub-lethal, effects when insects are exposed to chronic low doses. Exposure occurs through pollen and water droplets laced with the chemical as well as dust that is released into the air when coated seeds are planted. These effects cause significant problems for the health of individual honey bees as well as the overall health of honey bee colonies and they include disruptions in mobility, navigation, feeding behavior, foraging activity, memory and learning, and overall hive activity.

Clothianidin's Registration Lacks Field Data

Clothianidin was initially registered by EPA in 2003 on the condition that the registrant, German chemical manufacturer Bayer, would complete and submit a field study demonstrating the chemical's effects on pollinators. In addition to any registration of clothianidin being a violation of FIFRA's prohibition of chemicals that pose "unreasonable adverse effects on the environment," in December 2010 it was revealed that the pollinator study Bayer had submitted had been downgraded by EPA and deemed insufficient to fulfill the field study requirement upon which the chemical's registration was contingent. However, EPA took no action to ban or restrict clothianidin in light of this development and still does not have an acceptable pollinator field study for clothianidin. Thus, following the agency's own logic, there is no basis for allowing clothianidin to remain registered until a valid study shows bees are adequately protected.

EPA Understanding of Pollinator Adverse Effects Deficient

Judging by the pollinator data requirements that EPA has stated it is seeking for clothianidin's registration review, the agency is severely lacking in its understanding of how the chemical affects pollinators, and honey bees specifically. Despite allowing the chemical to be used on thousands of acres of American farmland over the past nine years, there is still a great deal EPA does not know about how bees are exposed to clothiandin and what the consequences of exposure actually are for bee health on the individual, colony, and species level.

Research Shows Bees Exposed to Higer Levels of Clothianidin than Previously Thought

A Purdue University study shows that honey bees' exposure to the bee-killing pesticide clothianidin, as well as its sister chemical, thiamethoxam, is greater than previously thought. Most pesticides that are toxic to bees carry a warning that the product cannot be applied while foraging bees are present. But, like other neonicotinoid pesticides, clothianidin is systemic and expressed through pollen, nectar, and gutation droplets. It is most commonly applied by seed treatment. The study, *Multiple Routes of Pesticide Exposure for Honey Bees Living Near Agricultural Fields*, published January 3, 2012 in the online edition of *PLoS ONE*, has been replicated by researchers at the University of Padova in Italy, published January 31. 2012 in *Environmental Science and Technology*.

During the spring planting season, the researchers found extremely high levels of the neonicotinoids in planter exhaust material (dust) produced during the planting of seed treated corn. Plants visited by foraging bees, dandelions in particular, growing near these fields were found to contain neonicotinoids in their plant material, suggesting uptake by wild plant species. During the spring, when neonicotinoid levels are highest, dead bees collected near hive entrances were found to contain clothianidin as well.

After the spring planting season, bees foraging through the summer continue to be exposed. When the corn begins to flower, the pollen is also contaminated with neonicotinoids. The authors note that the levels of clothianidin in bee-collected pollen that they sampled are approximately 10-fold higher than reported from experiments conducted in canola, which EPA had reviewed earlier during the registration process.