Do We Have A PESTICIDE BLOWOUT

Clothianidin is agriculture's Deep Water Horizon. 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.

Tom Theobald

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.

Clothianidin is just one of a number of pesticides in the family of neonicotinoids. Neonicotinoids are systemic pesticides, which means that they become incorporated into the system of the plant when the seed germinates. In the United States clothianidin was given a conditional registration by the EPA in 2003. Originally approved for use as a seed coating on corn and canola, it is now being approved for a growing list of other crops as well.

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 over the past several weeks.

It appears that two years later we have now had a repeat of this *"rare event,"* this time here in the United States. This bee kill occured in Indiana in April, reported by two entomologists at Purdue University in an article written for the Indiana Beekeepers Association newsletter and circulated widely. Titled "Pesticide Kill at the Purdue Bee Lab?" it reports a significant bee kill across Indiana, again believed to have come from fugitive dust from pneumatic corn planters.

According to these two entomologists *"Every corn seed that goes into the ground in Indiana these days has a coating of clothianidin on it. It has been a dry spring. We have had very warm, windy weather this week. As I watched my neighbor planting, I could see huge clouds of dust being stirred up."* As researchers at a major university, the authors had the resources to do some immediate analysis that would have been beyond the reach of most beekeepers, and they found high levels of clothianidin in the dead bees and the incoming pollen.

Along with other beekeepers, I have been concerned about clothianidin for some time, in part because it is not the first neonicotinoid to cause problems. Imidacloprid, the first, was registered in the U.S. in 1994 and was soon implicated in widespread bee kills. Several commercial beekeepers in North Dakota filed suit because of damage from imidacloprid used on sunflowers and similar damage in France from use on sunflowers led to a ban there in 1999. However it is still used without change in the U.S. France declined to even register clothianidin.

I became concerned about clothianidin in 2007 as the possible cause of a break in the Fall brood cycle I was seeing in my bees and in early 2008 I began digging into the facts surrounding its approval. That story is instructive and cause for great concern I believe.

The first record I found on the consideration of clothianidin comes in the form of an EPA memo dated February 23, 2003, titled "Risk Assessment for Seed Treatment of Corn and Canola." To their credit, EPA scientists raised serious concerns in that document and called for strong label language if clothianidin was to be approved for use. They cited the experience in France with imidacloprid as the basis for extreme caution and called for label language which would highlight the dangers. Quite responsibly, they called for a field test of the dangers *prior* to registration:

"*The possibility of toxic exposure to nontarget pollinators through the translocation of clothianidin residues that result from seed treatment (corn and canola) has prompted EFED* [Environmental Fate and Effects Division] *to require field testing that can evaluate the possible chronic exposure to honey bee larvae and queen. In order to fully evaluate the possibility of this toxic effect, a complete worker bee life cycle study must be conducted, as well as an evaluation of exposure and effects to the queen."*

and they called for strong label language as well:

"*This compound is toxic to honey bees. The persistence of residues and the expression of clothianidin in nectar and pollen suggests the possibility of chronic toxic risk to honey bee larvae and the eventual stability of the hive."*

This level of concern expressed by EPA scientists in February of 2003 wasn't to last however. In the next memo just two months later, dated April 10, 2003 - an Addendum to the Risk Assessment - EFED retreated. They stuck to their guns on the label language, sort of, but they appear to have been handed their heads by an EPA management that would brook no interference with corporate objectives. *"However, after further consideration* ..." is what the scientists had to say after having their attitudes adjusted:

"However, after further consideration, EFED would like to suggest that the registrant be given a conditional registration that is contingent on their conducting the chronic honey bee study that evaluates the sublethal effects of clothianidin over time. EFED will therefore defer the requirement for this bee labeling statement until after the chronic study has been reviewed."

Coast Guard photo

Bayer was given eight months, until December of 2003, to complete the study, but clothianidin was released to the market and the horses were out of the barn.

It is here, with the April memo, that the regulatory process begins to unravel. The condition of registration, the [chronic] life cycle field study, would go undone for years. "*After further consideration..."* meant that the real field test was to take place across the farmlands of America, without control and with serious concerns as to the safety of this pesticide unanswered.

The next memo, which established the final protocols for the field study, is dated March 11, 2004. The original deadline for the field study, upon which the conditional registration had been granted, had already passed three months before. Bayer requested and was granted, retroactively, an extension to complete the field study by May of 2005. All the while however clothianidin would be out on the market and useage would increase rapidly. This has become a common tactic in the corporate playbook, get these products out there by whatever means possible, get agriculture hooked, and then convince farmers they can't live without them.

Previously EPA scientists had clearly stated that any study should be done in the United States, but Bayer was given permission to do it in Canada instead. More significantly, rather than require that the field study be done on both crops, corn and canola, Bayer was allowed to test only canola, while corn was dismissed with a single sentence. This is significant because in the United States canola is a relatively minor crop, with less than a million acres grown. Corn on the other hand accounts for about 88 million acres. Further, we had just seen a decade of enormous damage to bees from a product called encapsulated methyl parathion, where contaminated corn pollen had been the major vector of damage and EPA scientists were well aware of this. I knew the biologist who signed off on the March, 2004 memo which dismissed corn so casually and he most certainly would have known of the dangers corn pollen could represent, yet Bayer was given a pass and was allowed to disregard corn.

Since clothianidin becomes part of the plant it is expressed in all parts of the plant, thus any insect which chews or sucks on the plant ingests the pesticide and dies. Don't worry though, we were told, it only affects the bad bugs. Besides, it's one of the new "green" pesticides, derived from a natural substance, nicotine (this is a whole other story, because like many other "green" pesticides it is a product of heavy chemistry, not nature). It also reduces the need for the application of other, supposedly more toxic pesticides we're told. Neonicotinoids have come under increasing criticism however, not the least of which has been leveled by the beekeeping industry and others for the alleged detrimental effects on honey bees and other pollinators.

The word "alleged" could start the fight I suppose, because critics believe the case against the neonicotinoids is complete and compelling. On the other hand, Bayer, and apparently the EPA, would have us believe otherwise. Much of the evidence is in the public arena now, and with the publication of this article, the conduct of the EPA, revealed through its own documents, will be as well. The readers can judge the evidence for themselves and draw their own conclusions. I'm presenting my view of the goings on and that can be part of your consideration. Obviously, I'm not without my own opinions in these matters.

The official life cycle study was to languish for years. In March of 2004 the initial deadline for the study had passed and the EPA granted Bayer an extension, until May of 2005, allowing further that if accurate data could not be produced in the summer of 2004, the study might be extended yet again, through the 2005 growing season. According to its own records, dated March 11, 2004, the

EPA says "*EFED wants usable data to decide the potential adverse effects to bees from clothianidin's seed treatment use and opposes rushing the study and having deficient information.*"

While this may seem to evidence concern, you must remember that this would mean a pesticide with serious questions as to its environmental consequences could then have been on the market and in wide use for three full growing seasons without any answers to those questions. While there may have been concern about rushing the study, there seemed to be no comparable concern about rushing an untested pesticide onto the market. These tests should have been completed before clothianidin was ever registered, as EPA scientists had initially recommended.

Then in May of 2008 we have the German incident – two thirds of the colonies in the Baden-Wurttemberg region killed, with 99% of the dead bees showing high levels of clothianidin. Within two weeks of this incident Germany had suspended the registration for clothianidin and this action was soon followed by bans in Italy and Slovenia. And what came from regulators in the U.S.? Silence. Worse than silence actually, because it soon began to appear that the EPA was going into hiding.

It was in the Spring of 2008, before the German incident, that I began investigating clothianidin. I did so because the previous Fall I had discovered that there was a break in the Fall brood cycle in nearly all of my colonies, and when I tried to match the symptoms to some known or suspected cause, the trail led to clothianidin.

I wasn't the only one who was concerned about pesticides. In the Fall of 2006 Pennsylvania beekeeper David Hackenberg had broken the story of huge bee losses, what would come to be called Colony Collapse Disorder, or CCD. Dubbed the great mystery by many researchers, over time more and more beekeepers began to believe that there was little mystery and that pesticides were a major ingredient in CCD.

The Natural Resources Defense Council had begun questioning the safety of clothianidin and subsequent to the incident in Germany asked the EPA to provide the long awaited life cycle study, which was by now four years overdue. The EPA failed to respond so the NRDC filed a Freedom of Information Act request. The EPA failed to respond once more and on August 18, 2008 the NRDC filed suit for the study.

It was just prior to the NRDC suit that I discovered the infamous missing study; the internet can be an amazing resource if you just keep digging and prying. Within a month of my discovery the EPA had put their review and approval of the study on their web site, apparently flushed out by the NRDC lawsuit. What the review does and doesn't reveal is disturbing.

Let me first put the study in a more agricultural context, and then look at it more closely. Let's say you had a noxious weed that was affecting your cattle and you wanted to assess the dangers. So you plant two and a half acres of the suspect weed in the middle of 2000 acres of lush Wyoming grassland and put four cows on the test plot. The cows aren't fenced in, however, and are free to roam over the entire 2000 acres. What do you think is going to happen? How long do you think your four cows are going to stay on your dinky little test plot? How significantly is that noxious weed going to be represented in their diet? I think you know the answers.

Here's what the life cycle study of bees and canola consisted of: four colonies of bees were set in the middle of one hectare (2½ acres) of canola planted from treated seed, with the bees free to forage over thousands of surrounding acres in bloom with untreated canola, which they most surely did. What do you think the results were? They were exactly what Bayer wanted of course.

Why was the chronic life cycle study and the EPA's review unavailable? Was it ineptitude? Perhaps it was simply embarrassment, because the study had been completed on August 1, 2006, already long overdue, and yet despite all the controversy had not been reviewed by the EPA until November 16, 2007, nearly a year and a half later, after clothianidin had been on the market for five full growing seasons.

Perhaps it was because in the opening paragraph of its review the EPA states unequivocally *"This study is scientifically sound and satisfies the guideline requirements for a field toxicity test with honeybees (OPP Gdln. No. 141-5; OPPTS 850.3040)."* Scientifically sound? If you're in 4th grade perhaps, but certainly not if you have a Phd after your name. They should be embarrassed, this makes a mockery of science.

Further concerns are emerging as a consequence of the Indiana bee kill. High levels of atrazine were found in the dead bees and pollen along with clothianidin. This suggests that dust alone may be a vector, with the atrazine contamination coming from airborn soil. We now find evidence, again from the EPA's own documents, that clothianidin can be persistent in the soil, remaning for years in some cases, and that it may accumulate from successive uses of treated seed, a common practice in the corn belt. Has the soil itself become a source of toxicity as a consequence of clothianidin use? Only further tests will give us answers to those questions.

What are we to do with circumstances like these? It is simply nuts, and yet this bogus science has now been

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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.

This is the Deepwater Horizon in agriculture. America's farmland is awash in these questionable chemicals as surely as the shorelines of the Gulf Coast are awash in crude oil, and for many of the same reasons.

The bees are telling us something. We need to start listening before it's too late. BC

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