NEONICOTINOIDS AND APIS MELLIFERA: REVIEW OF SCIENCE
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Good morning. My name is Dierdre Allen and I am a volunteer with the Vermont Chapter of the Sierra Club. I wish to speak to you this morning regarding the science behind the neonicotinoids and pollinators issue. My background is in regulatory affairs as a liaison between industry and the FDA regarding safety and toxicity of ingredients entering the food chain as either foods, food additives or dietary supplements. So I have spent over 20 years evaluating studies and then presenting my findings to the FDA.

When I first became involved in the neonicotinoid threat to our pollinators, I was told that the science was not clear and that there were conflicting findings being reported from both sides of the issue. Initially, it appeared to me that there were too many variables in all of the hundreds of studies to allow for comparisons to be made and subsequent conclusions to be drawn. So I narrowed my review to only those studies that evaluated the effects of neonicotinoids on Apis mellifera, the honeybee that would be found in Vermont. In addition, I excluded studies designed to only identify the lethal dose or lethal time.

I identified the studies to be reviewed by using the report commissioned by the European Food Safety Authority, which is a list and summary of all of the studies published on this issue from 1990 through June of 2014. I then did a search for all studies published since June of 2014. This resulted in a total of 389 studies. Using my exclusion criteria, I was able to narrow that number to 128 individual studies measuring 354 separate endpoints.

To review the studies, I pulled the full texts and compared the content of the full text studies to the summaries in the EFSA report and to the reports in the media. I also reviewed author biographies to identify conflicts of interest. I then created a spreadsheet tracking the study type, chemical used, endpoints measured, route of administration, dosage, outcome and notes. This allowed me to feel confident in making comparisons.

Of the 128 studies reviewed, 89 individual studies measuring 230 separate endpoints found toxic effects of the neonicotinoids on this one species of honeybee. Thirty nine individual studies measuring 114 separate endpoints stated that there were no toxic effects. Even though that shows a ratio of 2 to 1, it is still misleading. 14 of the 39 "not toxic" studies were funded by either Bayer or Syngenta, or they were published in a Bayer owned journal. In addition, some of the "not toxic" studies were conducted using only Bayer-issued field reports.

Of the 89 studies that did demonstrate toxicity, 43 found mortality at rates of between 52% to 100% with time to death as low as 0 hours – or upon contact. In fact, 14 studies found 100% mortality with dosages as small as 1/10 of a nanogram.

After working with this data over several months there are several conclusions that I feel confident in drawing:

- If a bee's immune system is compromised in any way, and it then comes in contact with neonicotinoids, it will die. Immune health can be compromised by age, time of year and various pathogens.
- Gross behavioral and neurological changes can result from even minimal contact.
- Viruses known to harm honeybees replicate faster in the presence of neonics.
- If it is humid and a bee comes in contact with a neonic, the bee will demonstrate toxic effects of that contact and will likely die in a short time.
- The lack of clarity regarding what the science is showing us is further clouded by the fact that many of the studies reporting safety of neonics are industry funded.
- Media reports of studies are often not accurate and represent the use of a press release rather than the review of an actual study. For example, a study may be reported in the media as determining that neonics are "not toxic" because the reported endpoints identified no toxicity up to 24 hours. But that same study will have identified mortality at 48 hours.

I believe we are at a critical point with this issue and if we do not address it quickly and aggressively, we will see serious consequences in our food security in the future. I appreciate the opportunity to speak with you today and would be happy to respond to any questions you might have.