Pollinator Stewardship Council
1617 White Water Ct. Berthoud, CO 80513
www.pollinatorstewardship.org
970-213-3099

October 30, 2020

Tulio Macedo, Chief
Pesticide Registration Branch
1001 I Street
Sacramento, CA 95814

Dear Mr. Macedo,

We are writing to comment on the Department of Pesticide Regulation's (DPR) draft proposed pollinator protection regulations regarding continued use of nitroguanidine neonicotinoid insecticides in California. Collectively, we bring many years of commercial and sideline beekeeping experience to our perspectives on this issue. Overall, our experience has shown that the impact of neonicotinoid insecticides on pollinators is extraordinarily difficult to manage using DPR's usual methods of risk reduction. While the proposed regulations begin to address the problems associated with the use of highly toxic, persistent systemic insecticides, they are not sufficient to protect the managed honeybees that contribute to an abundant food supply, nor will they protect the native pollinators. As beekeepers, we are interested in helping DPR develop mitigation strategies that allow pollinators to thrive.

California has a unique responsibility to the beekeeping industry in the U.S. Approximately 90% of the country's commercial bees come to California for at least two months of the year for almond pollination in February and March. Many colonies arrive in the late fall and don't leave until late spring the following year. Over 1,000,000 honey bee queens and more than 200,000 packages of bees are raised commercially in California,[1] primarily in the Sacramento Valley and Sierra foothills. Significantly, at an average price of $18 per queen and $85 per package,[2] the production of queens and packages in California is worth $35,000,000 to the economy. Many queens and packages are either shipped or later moved to many of the other states in the U.S. Thus, the risks associated with bee-toxic pesticide use in California do not just affect California bees and crop production, but bees and crop production nationwide. This fact creates a special obligation for DPR to ensure their regulations adequately protect pollinators. The fact that California has a robust pesticide regulatory system and authority to control pesticide use allows DPR to lead the way in pollinator protection, which we strongly urge you to do.

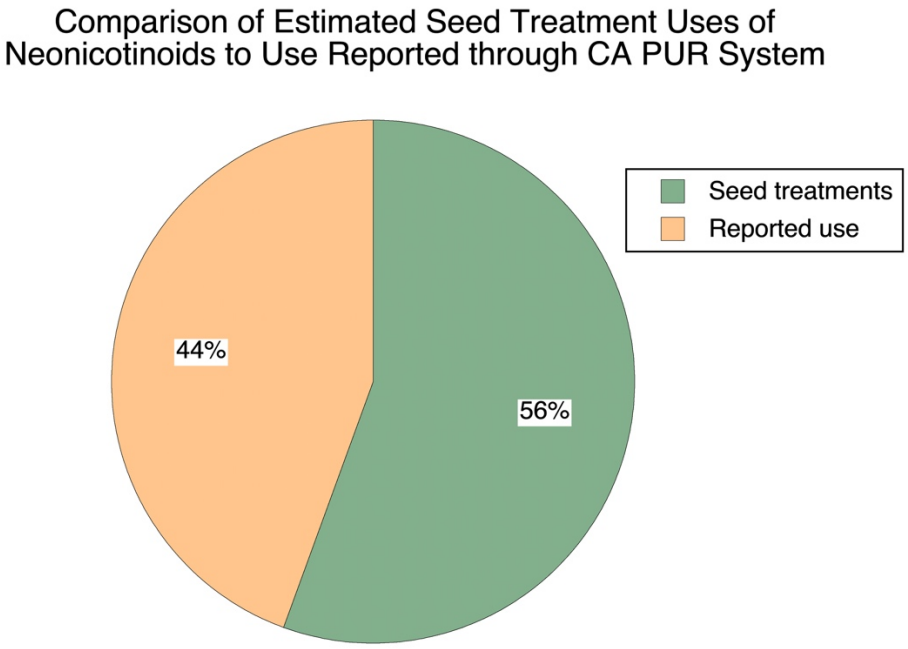
We highlight here our five major concerns with the proposed regulations:

1) Seed treatments contribute the majority of neonicotinoid use in California, but their use and subsequent impacts are not tracked or mitigated by DPR.
2) Adverse effects on honey bee queen viability are not solved by the proposed regulations.
3) The proposed label distinctions between commercially pollinated crops and crops not hosting managed pollinators do not provide protection for pollinators.
4) Restricting applications to blooming plants is not sufficient to protect pollinators
5) DPR needs to include all systemic, persistent insecticides in these regulations, not just the four nitroguanidine neonicotinoids.

We elaborate on these comments below. In brief, the proposed restrictions will not protect pollinators. The combination of toxicity, high water solubility, and persistence in the environment for these pesticides ensures that pollinators will experience both acute and chronic exposures through nectar, pollen, and water. Colony health will continue to be compromised. Our bees and our beekeeping operations are suffering from the widespread use of these pesticides. To best protect pollinators from systemic, persistent insecticides, DPR should eliminate all agricultural and outdoor residential uses of systemic persistent pesticides.

1) Neonicotinoid seed treatments are not tracked or mitigated

A recent report by Mineau,[3] in which nitroguanidine neonicotinoid seed treatment use in CA was estimated based on seeding rates, typical coating amounts, and the proportion of seed that is typically treated for specific crops, provides an estimate of 512,000 pounds of neonicotinoids used for seed treatments in 2016. Use of these pesticides reported through the Pesticide Use Reporting (PUR) system for foliar or soil applications was 410,000 lbs. Thus, DPR's proposed regulations only address 44% of total use of these pesticides.



The presence of this additional burden of neonicotinoids in the environment provides an additional exposure source for pollinators from pollen and nectar in plants grown from treated seed and further contaminates blooming field-side weeds from planting dust or runoff. Woody perennial plants take up these pesticides and express them in pollen and nectar for several years after a single exposure. The persistence of these compounds allows concentrations to build up in soils planted with treated seed year after year, increasing the amounts available for uptake by blooming plants on which pollinators forage. Waterways can act as a chronic exposure source, as these chemicals are slowly leached out with irrigation water runoff and pollinators gather water to cool the hive or dilute honey for food.

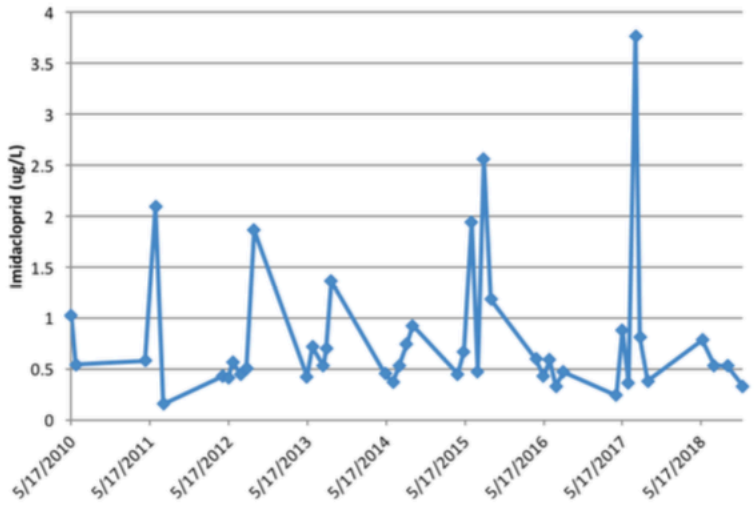
The proposed regulations include restrictions on total amounts applied, applications during bloom, and applications to fields under contract for commercial pollination. However, the fact that 56% of total use is for unregulated seed treatments indicates that the proposed risk reduction measures will not be comprehensive, resulting in additional risks to pollinators.

Risk reduction by restrictions on annual amounts used must account for ALL uses, not just 44% of use. Because of their high water solubility and persistence, the contamination of aquatic resources used by pollinators with neonicotinoids is of special concern. In particular, exposure of honey bee queens to water brought back to the hive, as well as pollen and nectar from seed-treated crops are a significant, unexamined exposure pathway. We will address issues that pollinators face from this contamination in the next section.

DPR already has data that indicate a substantial and growing amount of soil-applied neonicotinoids end up in California waterways. Mineau[3] used DPR's Surface Water Database (SURF)[4] of water sampling data to demonstrate common detections of neonicotinoids in CA

surface waters in agricultural areas. Figure 7 from this report (reference 3) is reproduced below as a representative example, showing that for the Salinas Valley agricultural area, nearly all samples showed detections of imidacloprid over the benchmark for protecting aquatic life of 0.1 μg/L. Insufficient sampling of clothianidin and thiamethoxam has been done, but as these two pesticides are the ones most used in seed treatments, they are contributing to exposure.

Figure 7. Imidacloprid residues at site 27-7 (Quail creek), a tributary to the Salinas River, Monterey County.



2) Adverse effects on honey bee queen viability are not solved by the proposed regulations

The use of the 410,000 pounds of nitroguanidine insecticides as foliar or soil applications plus the estimated 512,000 pounds used in seed treatments comprise a hefty pesticide burden for pollinators. As documented above, many of these applied pesticides end up in our waterways, as well as in the pollen and nectar that our bees use for food, leading to exposures for every member of a honey bee colony. The queen is the most important member of the colony, and her reproductive success or failure determines the fate of the colony.

Since "Colony Collapse Disorder" (CCD) was first documented in 2006, the nature of colony failures has changed. CCD is characterized by an empty hive with a few worker bees left surrounding the queen and the rest of the colony just gone. Today, it is queen failures that dominate the landscape. Often a newly installed queen will not live for more than a few months before she is superseded or dies. Queens used to be viable for several years, but no longer. In this same time frame, neonicotinoid use has increased, as has the use of several other bee-toxic pesticides. Several studies have shown that queen failure is directly associated with exposure to neonicotinoid pesticides.

Sandrock, *et al.*[5] exposed honeybee colonies to sublethal levels of thiamethoxam (5 ppb) and clothianidin (2 ppb) in pollen over two brood cycles, compared side-by-side with unexposed

control colonies. The exposed colonies exhibited decreased performance in the short-term resulting in fewer adult bees and brood, as well as a reduction in honey production and pollen collection. While this reduction in performance did not necessarily correlate with overwintering losses, the neonicotinoid-treated colonies were significantly associated with queen failures the following spring, with queen supersedure observed for 60% of the neonicotinoid-exposed colonies within a one-year period, but not for control colonies.

Wu-Smart and Spivak[6] evaluated the impact of sublethal levels of imidacloprid (0, 10, 20, 50 and 100 ppb in sugar syrup) on queen fecundity, finding reduced egg-laying and locomotor activity in queens, as well as impaired foraging and hygienic behavior in worker bees.

DPR's proposed regulations do little to protect queens. With nearly a million pounds of the nitroguanidine insecticides used each year in areas where queen rearing operations place their colonies, exposures through contaminated nectar, pollen and water are inevitable. Elimination of all outdoor uses of these pesticides is the best solution to reduce the damage.

3) Restricting applications to blooming plants is not sufficient to protect pollinators

Insecticides that are highly toxic to bees, water soluble, and persistent in the environment are incompatible with pollinator health, since these characteristics lead to exposure through pollen, nectar and water consumed by honey bee colonies. The neonicotinoids addressed in the proposed regulations are among the most toxic to bees, the most persistent (aerobic half-lives: 51 days (dinotefuran), 214 days (clothianidin), 229 days (thiamethoxam), 997 days (imidacloprid)) [7], and are highly water soluble, making exposure through pollen and nectar highly likely, even with the newly added restrictions on applications to blooming crops.

With this set of physical properties, the idea that DPR's proposal to restrict applications " . . . up until bud break" would protect pollinators is simply not tenable. Soil applications are particularly problematic, as a number of studies indicate that concentrations in pollen and nectar continue to increase over time as the pesticide is continually absorbed from the soil. Below we highlight a few representative studies. A summary of these and other studies demonstrating the presence of residues in pollen and nectar long after the application date can be found in reference 8.

1) Byrne *et al.*[9] studied the persistence of imidacloprid in citrus trees. Imidacloprid residues in nectar from trees treated 50 or 55 days before bloom via soil drench at 0.5 lbs/ac were documented between 2.9 and 39.4 µg/L. Imidacloprid was present in nectar with residues between 2 and 16 µg/L in citrus trees treated either 227 or 232 days before bloom.
2) Stoner and Eitzer[10] studied squash plants treated five days after transplant with imidacloprid via soil application and found that nectar contained 5–14 µg/L of imidacloprid; pollen showed concentrations ranging from 6–28 µg/L.

Limiting application to just before bloom will not prevent exposure. The only way to protect pollinators from adverse effects associated with persistent, systemic insecticides in pollen and nectar is to not use them at all in outdoor settings.

4) The proposed label distinctions between commercially pollinated crops and crops not hosting managed pollinators do not provide protection for pollinators

The new proposed regulations change some of the application rates and timing of applications to crops under contract pollination. However, the bees do not distinguish between the melon field being commercially pollinated and nearby melon field that is *not* being commercially pollinated, thus exposures will not be mitigated. Additionally, the proposed label mitigations for crops under contract pollination are rarely different than the blanket prohibition on applications to blooming crops in section YYYY.1. This is an artificial distinction and will have minimal effect on risk mitigation.

5) DPR needs to include all systemic, persistent insecticides in these regulations, not just the four nitroguanidine neonicotinoids.

The proposed regulations only address four nitroguanidine insecticides. While these are among the most acutely toxic insecticides to bees, there are others that are also toxic at levels found in pollen and nectar and are also highly water soluble and persistent in the environment. Sulfoxaflor and flupyradifurone are recent additions to the list of registered pesticides that fall in this category. DPR should be applying restrictions or eliminating uses of all such pesticides.

To summarize, DPR has proposed new regulations to protect pollinators. These regulations do not actually protect pollinators, omit major use patterns and their effects from consideration and propose actions that the available data clearly show will not mitigate exposures significantly. We urge DPR to prevent harm to pollinators by prohibiting outdoor uses of all bee-toxic systemic, persistent pesticides. Attached please find the Pollinator Stewardship Council's June 2020 comment letters, shared with the EPA, urging the same thing.

Prepared by: Pollinator Stewardship Council and Dr. Susan E. Kegley, Principal Scientist, Pesticide Research Institute

Endorsed by:

American Beekeeping Federation
Joan Gunter
President
500 Discovery Parkway, Suite 125
Superior, Colorado 80027

References

[1] Gene Brandi, personal communication with Steve Ellis.

[2] Average price of queens and packages from NASS, March 19, 2020. Honey Report. ISSN: 1949-1492. https://usda.library.cornell.edu/concern/publications/hd76s004z?locale=en

[3] Pierre Mineau, *Neonicotinoids in California: Their Use and Threats to the State's Aquatic Ecosystems and Pollinators, with a Focus on Neonic-Treated Seeds*, (Sep. 16, 2020) https://on.nrdc.org/2HhTlRw

[4] DPR, 2020. Surface Water Database (SURF). https://www.cdpr.ca.gov/docs/emon/surfwtr/surfdata.htm

[5] Sandrock C, Tanadini M, Tanadini LG, Fauser-Misslin A, Potts SG, Neumann P. Impact of Chronic Neonicotinoid Exposure on Honeybee Colony Performance and Queen Supersedure. Desneux N, editor. PLoS ONE. 2014;9: e103592. doi:10.1371/journal.pone.0103592

[6] Wu-Smart J, Spivak M. Sub-lethal effects of dietary neonicotinoid insecticide exposure on honey bee queen fecundity and colony development. *Scientific Reports.* 2016;6: 32108. doi:10.1038/srep32108

[7] DPR, 2019. *Status Report 2018: Pesticide Contamination Prevention Act*, https://www.cdpr.ca.gov/docs/emon/grndwtr/chem_data.htm

[8] See Chapter 6 in Hopwood J, Code A, Vaughan M, Biddinger D, Shepherd M. 2016. *How Neonicotinoids Can Kill Bees*. Xerces Society for Invertebrate Conservation. https://xerces.org/publications/scientific-reports/how-neonicotinoids-can-kill-bees

[9] Byrne FJ, Visscher PK, Leimkueler B, Fischer D, Grafton-Cardwell EE, Morse JG, 2013. Determination of exposure levels of honey bees foraging on flowers of mature citrus trees previously treated with imidacloprid. *Pest Management Science* 70(3):470–82.

[10] Stoner KA, Eitzer BD. 2012. Movement of soil-applied imidacloprid and thiamethoxam into nectar and pollen of squash (*Cucurbita pepo*). *PloS ONE* 7(6):e39114.