

To: Board of Supervisors, Marin County  
From: Douglas Fairclough, Mill Valley  
Date: December 4, 2013  
Re: Department of Agriculture Invasive Weed Plan

I am a beekeeper operating in Marin County, with hives in five apiary locations. I recognize the need to remove invasive weeds from Open Space, but I am concerned about the Department of Agriculture's 10-Year plan for the following reasons:

- 1) I would like to see a mention in the plan concerning replantation efforts. Some solutions would be cost effective to add, such as scattering seed in the wake of the removal. Plants could be selected which benefit native pollinators (as well as honeybees). As an example, Clover seed costs \$25 for a 50-pound bag.
- 2) There does not appear to be a publicly stated protocol in place to inform the public when a spray is to occur. In that way, beekeepers would have the option of keeping the bees within the hive during the spray period.
- 3) There are mating yards in remote areas in Western Marin used by commercial beekeepers, who create "packaged bees" for resale. These areas are chosen due to their isolation, which enables mating to be controlled such that specific genetic lines can be preserved (and then marketed as such and sold). It could constitute catastrophic loss if sprays were done at or near these yards concurrent with the time mating activity was occurring, as the beekeeper would need to disclose the occurrence of the spray. Or, at worst, start over. This ties back into the need to have protocols established such that proper due notice, such as on a website, is given.
- 3) An important rule to follow when spraying herbicides is that they not be sprayed during bloom times. Yet, the 10-year plan designates Spring as the start time for resource application. Unfortunately, this time frame coincides with the (rather brief) "honey rush" when bees are building nectar reserves at full blast. It would be preferable for any spray to be done when the targeted plants are not in bloom. Also, as it turns out, some of the plants (such as thistle) that are targeted for spray are used by bees as a pollen and nectar resource.
- 4) Of the herbicides being proposed, the inert agents are not disclosed. Very recent research has shown the "inert" adjuvants to be just as toxic to honeybees as the active ingredients. This is important to understand because inert adjuvants are not disclosed. Therefore, there is no transparency on what is being applied. Therefore, I cannot support the application of an herbicide when I don't know what is in it. This is fundamental and basic.

In the November 2013 issue of the *American Bee Journal*, an article by Randy Oliver (who is known for an exceptionally conservative science-based approach) included the following excerpt of recent research concerning the effects of inert ingredients on honeybees. The work of Mr. Oliver can be viewed in full on his website:

<http://scientificbeekeeping.com/>

"Learning was [rapidly] impaired after ingestion of 20 ug of any of the four tested organosilicone adjuvants, including harmful affects on honeybees caused by agrochemicals previously believed to be innocuous. "

These findings concerning commonly used inerts (previously believed to be innocuous but actually found to be harmful) parallels the recent findings concerning fungicides, which were also believed to be innocuous until the scope of testing was broadened to include the effects of fungicides on honeybee larvae. Honeybee larvae are the most vulnerable as they are developing from an egg and do not have a full set of defenses yet in place.

The article continues:

"One of the common adjuvants is a solvent NMP, described [by manufacturer BASF] as follows: 'NMP is given preference over other highly polar solvents because it is exempt from the requirement of a tolerance when used as a solvent or cosolvent in pesticide formulations applied to growing crops..'"

Note that "exempt from tolerance" means that there is no limit to the amount that can be applied (specifically, the amount of residue it leaves behind). So, while the active ingredients have strict limits as delineated by a percentage that goes out to the 100th place, inert ingredients have no such limits -- nor any specificity.

NMP has been shown in study to kill bee larva.

Here is the link:

<http://www.extension.org/pages/58650/proceedings-of-the-american-bee-research-conference-2011#UhDTZW-aucw>

(The item of interest there is #20.)

And here is the relevant excerpt from that link:

"Formulations usually contain inerts at higher amounts than active ingredients, and these penetrating enhancers, surfactants and adjuvants can be more toxic on non-targets than the active ingredients. Inerts often enhance the pesticidal efficacy as well as inadvertent non-target effects of the active ingredient after application."

"We have found that the nonionic surfactants Triton X-100 and Silwet L-77 were highly lethal to adult honeybees at an oral dose of 1% in artificial nectar while N-methyl-2-pyrrolidone (NMP), although less toxic to adults, was more acutely toxic to the brood. NMP is a member of a new generation of penetration enhancers added to pesticidal active

ingredients to increase their systemic uptake into plants or animals. Use of novel microemulsion formulations of agrochemicals are often dependent on this and newer organosilicone adjuvants such as Silwet L-77. The latter at 0.1% significantly reduced learning performance of forager honeybees at 0.1% using the proboscis extension reflex (PER) assay."

"Given the synergistic nature of certain chemicals, we are concerned that active ingredients may affect honeybees differently depending upon the inert ingredients in a particular product formulation or in certain combinations found in field use patterns. There is a new tendency to market pesticide blends including seed treatments that contain multiple classes of insecticides or fungicides, or their mixed combinations, that require these newer 'inerts' to achieve high efficacy. The fact that some inert ingredients may indeed be more toxic than active ingredients such as in formulations of the herbicide glyphosate makes this issue especially important for the health of honeybees and other pollinators."

Now, I don't know if any of the herbicides in the recommendation contain any of the specific "inert" compounds just described, but that is just the problem: these ingredients are not disclosed. However, what we do know is that some of the most commonly used "inert" adjuvants kill honeybees.

I liberally include the findings of this one specific research not in order to promote one particular study that has some shock value. But rather, given that the toxicology of the hive is enormously complex, I include these details in order to point out that while our understanding of the effects of pesticides upon honeybees is increasing, it is not yet fully realized. After all, it was not that long ago that fungicides were thought innocuous; similarly, it is not that long ago that inert ingredients were thought innocuous.

My hope is that the BOS rejects the current plan so that alternative organic approaches can be more thoroughly investigated. In that way, a cost benefit analysis can be done, and more inputs from diverse sources can be incorporated into the eventual plan, so that the problem with invasive weeds can be addressed in a more comprehensive manner.

I understand and appreciate the very real impact and threat to our agricultural community and ecosystem from the rapid spread of invasive weeds. However, honeybees are vital to the survival of our agriculture and ecosystem and, as explained above, not only the active ingredients but also the "inert" ingredients in pesticide formulations are contributing to honeybee colony health issues. It is essential that these risks are included as a part of the equation when approving and implementing this plan, and when considering the amount of resources to devote to this plan, so that choices are made with all risks honestly and scientifically assessed.

Thank you.

Sincerely,

Doug Fairclough  
Mill Valley, California