Comments on the California Department of Food & Agriculture's July 2014
"Integrated Pest Management Analysis of Alternative Treatment Methods to Eradicate Japanese Beetle"

For most of the past 5 years including summer 2015, the California Department of Food & Agriculture (CDFA) has been spraying three pesticides (carbaryl, cyfluthrin, and imidacloprid) in Sacramento for the Japanese beetle These pesticides are linked to cancer, birth defects, miscarriages, nervous system damage, and extreme toxicity to bees and aquatic life, among other health and environmental impacts. The document reviewed here is CDFA's analysis (and rejection) of least- and non-toxic alternative treatments recommended by USDA. CDFA's analysis can be found at: http://www.cal-ehi.org/Cal-ehi.org/Japanese_beetle.html.

Overall comment: CDFA's analysis asserts that the agency is using integrated pest management (IPM), which is a strategy that combines a multitude of environmentally sound pest-management strategies and prioritizes least-toxic methods for long-term prevention and management of pest problems. The intent is to minimize harm to people and the environment. IPM does not rely on a single technique or tool in isolation.

However, CDFA's analysis of what it terms "IPM" alternative options for the Japanese beetle evaluates each technique in isolation, not as part of an integrated program that combines multiple strategies. Thus, CDFA's analysis is not of an IPM strategy but of individual techniques that are ruled out as ineffective because each one, used alone, cannot address the whole life cycle of the beetle. However, CDFA's analysis does not hold the 3 hazardous pesticides that the agency is using to the same standard of evaluation that it applies to the less-toxic strategies. Just as CDFA concludes for the individual "IPM alternatives," each pesticide by itself would not produce the desired results because some target only the beetle larvae (grubs) while others target only the adult beetles. CDFA utilizes a double standard to conclude that its choice of toxic pesticides is the only effective solution even though the pesticides exhibit the same flaws for which the safer alternatives are ruled out. Therefore, CDFA's IPM analysis document is misleading because it evaluates the safe alternatives as if they would not be used together while evaluating the agency's chosen pesticides used in combination. Moreover, CDFA's analysis does not evaluate a true IPM strategy but only individual isolated components.[1]

Comments on the details of CDFA's analysis:

In paragraph 1, CDFA incorrectly states that the pesticide carbaryl is a synthetic organophosphate. Carbaryl is a carbamate.

The next sections below address CDFA's analysis of individual least-toxic treatment methods.

Mass Trapping: CDFA discounts mass trapping as a method to control Japanese beetles on the basis that trapping reduces beetle populations by only 40-50%. However, this conclusion is based on concentrations of 1 trap per acre. Such a sparse placement of traps does not constitute mass trapping and could be compared to applying the pesticides that the agency is utilizing to only 1 property in a 1-acre spray zone. This would not successfully control beetle populations either. CDFA also says that mass trapping would encourage beetle mating as a small-scale eradication technique within a larger infested area. However, no definition is given of "small scale" or "large infested area," making the statement meaningless. Why would the agency only trap in a small portion of a larger infested area as its statement implies? Effective mass trapping would use many traps per acre throughout the entire treatment zone and beyond. CDFA's analysis does not discuss the effectiveness of this technique and thus does not analyze a realistic mass trapping approach. It appears that the agency has defined the parameters so that mass trapping can be dismissed from consideration.

***Active Beetle Removal*:** Adult beetle removal is meant to help manage adult beetles. However, CDFA dismisses its effectiveness because it does not control beetle larvae (grubs), stating that if adult beetle control were used in isolation, "Grubs live in the soil in and around plant roots, so all potentially infested plant roots and associated soil in the entirety of the eradication area would have to be removed and disposed of in order to remove the larvae from the environment." It is inappropriate to dismiss adult beetle removal as an effective technique based on its ineffectiveness in controlling grubs because it is not designed to control grubs. As mentioned in the overall comment above, in a true IPM program, multiple techniques would be used in combination, and an additional technique(s) would target grubs. Using the rationale that adult

[1] Applying CDFA's "logic" to an everyday example, consider the individual components necessary to bake a chicken. You cannot bake chicken with just the chicken or just the oven or just the pan. Using the logic of CDFA's IPM analysis for the Japanese beetle, the conclusion would be that these components cannot be used to successfully bake chicken. We all know better. If you use them together, the result will be dinner.

beetle removal is ineffective because it does not control beetle grubs, CDFA should also conclude that the pesticides carbaryl and cyfluthrin are not acceptable tools because they are not effective against grubs in the soil.

Host Plant Removal: CDFA's dismissal of host plant removal is based in part on the assertion that property owners may oppose this option. CDFA's analysis does not take into consideration that property owners might prefer having plants removed to having their property (including edible plants) sprayed with hazardous pesticides. Moreover, even if some residents may not want to utilize this option, that does not mean that this option is ineffective. CDFA's ambiguous statement that host plant removal "may possibly promote the dispersal of beetles" is not supported by any documentation or evidence.

***Cultural control*:** This strategy is, like the other safe alternatives in CDFA's analysis, discussed as a stand-alone strategy, not as part of an integrated program, on the same grounds as mentioned under host plant removal: that cultural control "may possibly" drive pests outside the treatment zone. The key word is "may." Where are the scientific data to support that statement?

***Milky spore*:** The CDFA analysis states that it can take 2 to 3 years to build up sufficient numbers of spores to control a beetle population. This would only be true if sufficient numbers were not applied initially. CDFA also claims that there are insufficient beetles to allow build-up of the spores. This could easily be counteracted with repeated applications. This is not different from CDFA's repeated chemical treatments in the same areas for multiple years because the beetles keep reappearing. Therefore, it's unclear why a 2- to 3-year build-up period is considered a problem. CDFA's review discusses other bacteria that have been shown to be effective in treating the beetle but states that these bacteria are not registered for use in California. CDFA has obtained emergency registrations for toxic pesticides to be used in eradication programs in the past; milky spore could similarly be registered for use. CDFA also claims that the use of milky spore on the east coast did not eradicate the beetle there, but, once again, that is evaluating milky spore as a stand-alone approach, not as a component of an IPM strategy.

***Nematodes*:** CDFA's statements about these minute, worm-like beneficial organisms are misleading or simply incorrect. Nematodes are not problematic as CDFA claims. For example, the agency says that nematodes require loose soil because they need to be able to move through the spaces between soil particles. That is certainly true. But that is true of roots, water, fertilizer, air, and the multitude of other organisms that currently live in our soils. Based on CDFA's analysis of soil conditions in the beetle treatment zone, it would be problematic to grow plants there too. We agree with CDFA's comment that nematodes work best in most soils. CDFA's review also states that nematodes "generally have a narrow soil temperature range in which they work best. The website of Arbico Organics, a company that commercially produces one of the nematodes used for Japanese beetle, Heterorhabditis bacteriophora, states (http://www.arbico-organics.com/product/nemaseek-beneficial-nematodes-hb-heterorhabditis-bacteriophora/organic-lawn-care) that these nematodes work in a temperature range from 42˚F to 90˚F at a soil depth of 2 inches and work best when best the soil temperature is 65˚. Soil temperature data in the Sacramento region (based on 2003-2006 readings, averaging the reporting stations at Fair Oaks, Davis, Nicolaus, Lodi) are well within the acceptable range most of the year and for several months are ideal (http://www.farmerfred.com/soiltemp_eto.htm):

January: 46-52 degrees	July: 76-82
February: 48-53	August: 73-79
March: 51-58	September: 69-75
April: 56-62	October: 64-69
May: 62-69	November: 57-61
June: 71-77	December: 49-54

Nematodes are being used successfully to control a variety of beetle grubs and other insects in the Sacramento area. They are so effective that many area nurseries are selling them. Soil conditions and temperatures are appropriate for them to function as a component of an IPM program to treat Japanese as well as other beetle grubs.

***Parasites and predators*:** CDFA's report states that 3 parasites and predators are considered somewhat successful against the Japanese beetle but are not commercially available. It is our understanding that CDFA has raised beneficial insects (or contracted their production) in the past for use as biological controls when these insects were not commercially available. To claim that parasites and predators cannot be used just because they are not currently commercially available is misleading and possibly incorrect (for example, Spring tiphia wasp appears to be available from Symbiont Biocontrol, http://www.drmcbug.com/). As in several other instances previously described, CDFA misrepresents what an IPM

program is by stating, “Parasites and predators in general are not considered an effective stand-alone eradication method…”

***Sterile Insect Technique*:** CDFA discounts this approach, which the agency uses heavily for fruit flies, just because it has not been developed as a control tactic for Japanese beetles in the past. That does not mean that it would not work.

The next 3 sections address CDFA’s analysis of the 3 pesticides CDFA is using in its “beetle eradication program.”

***Tempo SC Ultra*:** CDFA’s analysis states that Tempo SC Ultra (active ingredient: cyfluthrin) is “effective against Japanese beetle.” However, the product label (www.cdms.net/LDat/ld2JM007.pdf) states that this product only controls Japanese beetle adults. Therefore, if CDFA consistently applied the same criteria to all treatment alternatives in its analysis, Tempo SC Ultra should have been evaluated as an unacceptable method of management because it affects only adult beetles. The comments for Tempo SC Ultra should say the same thing as for “Adult Beetle Removal” in regard to the need to remove “all potentially infested plant roots and associated soil in the entirety of the eradication area… in order to remove the larvae from the environment.”

***Sevin SL*:** The report states that Sevin SL (active ingredient: carbaryl) is “effective against Japanese beetle.” However, the product label (www.cdms.net/LDat/ld5ER002.pdf) states it only controls Japanese beetle adults. Therefore, just lie for Tempo SC Ultra, using CDFA’s own criteria, Sevin SL should have been evaluated as an unacceptable method of management because it does not address grubs.

Soil Treatment: CDFA’s document states that Merit 2F (active ingredient: imidacloprid) is most effective against young larvae. The pesticide label (www.cdms.net/LDat/ld47D009.pdf) states that the pesticide is used to control soil-inhabiting pests. Therefore, this material does not control Japanese beetle adults, which do not inhabit soil. Using the reasoning CDFA applied throughout its analysis of the non-toxic treatment methods, the agency should have concluded that Merit 2F is “not considered an effective stand alone eradication method” because it only targets grubs, and CDFA therefore should not be using this product.

The document also states that Merit 2F “is generally considered safe for beneficial insects.” That directly contradicts the University of California (UC) Statewide IPM Program evaluation (http://www.ipm.ucdavis.edu/TOOLS/PNAI/pnaicompare.php?pn=7404&x=101&y=44), which states that imidacloprid has moderate to high toxicity to beneficial insects and very high toxicity to bees. The UC IPM webpage also states that imidacloprid has moderate acute toxicity to people and other mammals.

Least-toxic pesticides omitted from CDFA’s analysis: CDFA’s analysis of chemical control options only lists the pesticides the agency prefers to use. There is no mention of less-toxic pesticides that could be employed as part of an IPM strategy. These options include neem *(*https://web.extension.**illinois**.edu/clw/downloads/22329.pdf*)*, azadirachtin (https://web.extension.**illinois**.edu/clw/downloads/22329.pdf*)*, spinosad (https://web.extension.**illinois**.edu/clw/downloads/22329.pdf*),* natural pyrethrum, citric acid, and various combinations of these materials (e.g., neem with insecticidal soap).

Conclusion

CDFA ruled out all of the less-toxic alternatives considered in its analysis on the grounds that these alternatives are not acceptable stand-alone products. However, the same holds true of the toxic pesticides that CDFA is using. This inconsistent evaluation is not an adequate basis for dismissing safe alternative beetle treatments.

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