College of Agriculture, Food, and the Environment
Dept. of Entomology
S-225 Ag. Science Bldg. N.
Lexington, Kentucky 40546-0091

tel. (859) 257-7458
fax. (859) 323-1120

dapotter@uky.edu

Karen Ross, Secretary of the CDFA
Matthew Rodriquez, Secretary for Environmental Protection
Gina Solomon, Deputy Secretary for Science and Health, Cal EPA
Brian R. Leahy, Director of Pesticide Regulation
Roberto Rodriguez, Regional Supervisor, USEPA
Jason Leathers, Primary State Entomologist, CDFA
Rick Kreutzer, Chief, Division of Environmental and Occupational Disease Control
Members of CDFA's Japanese Beetle Science Advisory Panel (SAP)

Dec. 4, 2015

Administrators and Colleagues:

I was invited to serve on the SAP for CDFA's Japanese Beetle (JB) Eradication Program in Sacramento but had to decline because of academic and family conflicts. However, as an expert on this pest I wish to offer recommendations and hope that you will consider them.

Earlier this fall I was contacted by representatives of Fair Oaks and Carmichael neighborhood associations and received detailed videos of the spray crews in action. One of those videos is attached. Since October I have corresponded with the residents to answer their questions about JB biology and control out of respect for their concerns. I am not being compensated my advice, or for writing this letter. My perspectives are based on 37 years' experience studying JB biology and control. My academic credentials include >200 refereed scientific articles and invited published reviews, 87 of which deal wholly or in part with JB (more published field research on JB than any other active scientist in the world) and consulting for compliance with USDA quarantines on JB at airports. I understand the implications for CA agriculture should JB become widely established there. I shared and discussed the videos with other experts; e.g., Dr. Tim Paine (UC Riverside) and Dr. Michael Raupp (Univ. of Maryland) who, like me, are Fellows of the Entomological Society of America and received its highest recognitions for urban landscape entomology. I have permission to share their reactions.

My opinion and those of the aforementioned experts is that the current CDFA spray program is very unlikely to eradicate JB populations from neighborhoods where a small number of beetles were trapped. Rather, it is likely to cause additional problems; e.g., bee kills, outbreaks of scale insects, mites, and other plant pests due to elimination of their natural enemies, and harm to urban bird populations directly or by depleting the native insects they require as food for brood-rearing. I do not believe the JB issue in Sacramento County can be resolved with chemicals. This area has historically had far more than its share of "incursions" given that aircraft, trains, automobiles, and nursery stock arrive every day into all California cities. This suggests to me a

long-term, low level resident population and the futility of spraying a residential area year after year every time that a beetle is caught.

Allow me to elaborate and offer suggestions for improvement.

The videos depict an approach reminiscent of archaic 1950s DDT spray programs including a) spraying without verifying pest presence, b) spraying plants and plant strata where JB are very unlikely to be while missing preferred feeding sites, c) spray crews' inability to recognize host or non-host plants, d) absence of scouting or knowledge to time applications for optimal control, treating xeric lawns incapable of supporting larval development, d) use of broad-spectrum insecticides when "greener" more effective products are available, and e) pesticide label violations including spraying flowering plants attractive to bees, contamination of impervious surfaces (risk for runoff and water pollution), spraying in wind, and failure to protect applicators and bystanders from ocular, respiratory and dermal contact with spray drift.

The spray crews cannot keep an active residue on every leaf and flower upon which JB adults might feed or hide, nor treat every nook and cranny of soil habitat (e.g., watersheds, river banks, mulched plant beds) where grubs could potentially develop. JB concentrate their feeding in the upper vertical strata of host plants so the sprays are missing some of the prime places where the beetles would be <u>if</u> they were present, which on nearly all properties they are not. But spraying the upper strata of trees and hedges poses unacceptable hazard from spray drift. In my opinion, spray-based eradication protocols developed for simplified habitats; e.g., around airports or agricultural fields, are unlikely to be effective for complex residential neighborhoods.

The videos depict inability of crews to identify JB hosts and non-hosts. Just because a plant is in the same genus as a "susceptible" plant does not mean it's a host (e.g., red and silver maple are completely resistant, sugar and Norway maple are susceptible; all four are congeneric). And those host lists (derived from Fleming's 1973 monograph) are based on Eastern plant species and may not be applicable to CA plantings.

Even for plants that *might* be susceptible there is no effort to verify if beetles are there, or will be. This contradicts every modern approach to pest control. Furthermore, there seems to be no regard for timing to coincide with vulnerable life stages. Imidacloprid is ineffective as a soil treatment except when the grubs are newly hatched and small. Is the seasonal life history of JB even known in California?

I have seen the two proposed CDFA protocols for lawns. One of them calls for application of herbicide, then trenching the perimeter to 9" and application of plastic sheeting over the whole yard for a full growing season. The other calls for removing all turf, roots, and soil to a depth of 9". <u>Both proposals are absurd</u>. How will other the plants in the landscape; i.e., trees, shrubs, and flowers, survive without soil, water, or air exchange? If the property is replanted, what happens if a beetle is captured in the neighborhood next year? Go through all that again? Also, JB grubs can develop on roots under mulched plant beds, so those would need to be solarized or dug up and carted off, too. These onerous, expensive, scorched-earth suggestions are too silly to warrant consideration. A single application of Acelepryn at low rate (0.1 lb active ingredient per acre) would be more effective for controlling grubs.

I have also read suggestions from D.G. Kelch for adding CA plants to the host list. The premise of his so-called "centrifugal phylogenetic method" (jargon) is that an invasive pest is more likely to feed on novel plants that are closely related to susceptible hosts than on distantly-related ones. That's generally true, BUT – the Eastern plant host list of JB includes >300 plant species in about 80 families, so the list of plants related to those plants gets very big very fast. Also, JB has powerful detoxification enzymes that allow it to feed on a very wide range of plants irrespective of their chemical defenses. So, to spray all plants that JB *could conceivably feed on* is a losing battle - impractical, expensive, environmentally harmful, and non-sustainable for all the other reasons I've discussed. Also, those crews clearly can't identify which plants are which!

How can the program be improved?

1) Start with a neighborhood grid of traps monitored by a handful of competent scouts (trained municipal employees or entomology student workers from UC Davis). Traps are very effective for detection, environmentally non-intrusive, and likely to be more effective (and much cheaper) than haphazard spraying for eliminating very low JB populations in neighborhoods having complex vegetation. A trapped beetle is just as dead as one killed by spray residues. The traps are more likely to lure beetles from their haunts than the haphazard spraying is to contact them. NOTE: I am not advocating traps alone (below).

2) IF a JB is trapped, deploy a higher density grid of traps in a 100-m radius of the catch point. JB flight to olfactory cues is relatively short-range. It is very unlikely that a JB responds and flies upwind to a lure from >100 m away. If additional beetle(s) are detected, then plants on that property and neighboring ones should be examined by trained scouts to determine where sprays should be directed. GIS maps can be used to mark and relocate highly preferred hosts that should be scouted first if beetles are detected. Use of trap grid and "indicator" plants will allow much more targeted and effective spraying (if necessary at all) and at much lower cost.

3) Replace the broad spectrum insecticides currently being used with chlorantraniliprole (Acelepryn, Syngenta). Carbaryl and cyfluthrin are acutely toxic to bees and other beneficial insects. Cyfluthrin kills aquatic organisms, including fish, and is a risk for runoff from impervious surfaces into watersheds. Exposure to its spray mist causes dermal, respiratory, and ocular irritation in humans. Carbaryl is a 1970s era synaptic poison that requires high application rate. It has only 1-2 week's residual effectiveness against JB on foliage, requiring frequent reapplication. Imidacloprid, a neonicotinoid, is systemically toxic to bees, a probable hazard given CA's long growing season and proximity of blooming plants to treated lawns. Chlorantraniliprole has a far more benign environmental profile, making it a better choice for adult and larval control. Its margin of safety is reflected in EPA requiring no signal word on the label. It is relatively non-toxic to bees, and its residual effectiveness against JB is longer than carbaryl or cyfluthrin, meaning less frequent applications (and cost savings) when treatment is warranted. It is labeled for JB grub control in CA and Syngenta is applying for 2ee labeling for adults. The latter might be expedited by 24C Special Local Needs registration.

4) JB eggs and young larvae require soil moisture (4-9%, depending on soil type) to survive. In arid CA, JB eggs and grubs are very unlikely to survive except in irrigated lawns, mulched plant beds, or cropland, or perhaps in moist river banks. Beetles will not lay eggs in xeric lawns so dry, non-irrigated ones do not need to be sprayed. Irrigated lawns are a logical risk site for infestation. Ideally there should be confirmation of infestation before treatment but that may be

impractical. But there is no reason to treat lawns unless traps first confirm JB presence on that property or on neighboring ones. Acelepryn is a better choice than imidacloprid if treatment for grubs is warranted.

5) CDFA could save money, reduce harm to the environment, and cultivate a better working relationship with property owners by promoting re-landscaping and xeric lawns to eliminate JB host plants, thereby reducing locations hospitable to the beetle where intervention is needed.

Bottom line:

1) Establishment of JB in CA vineyards and irrigated cropland could have far-reaching consequences. I understand that as a protected State committed to staying JB free as long as possible, CA must be proactive and aggressive in combatting this pest. The risk of establishment is ongoing and growing, potentially via aircraft and especially through grubs in nursery stock shipped from other states. Blanket or haphazard spraying of suburban residential properties year after year does not resolve that. This threat is never going away. The current CDFA program perpetuates and strengthens the myth that it can be solved with chemicals.

2) Some persons will argue that chemical eradication programs have worked elsewhere. I challenge that dogma. JB is established in Colorado and there are active populations in Utah and other states where chemical eradication was attempted. Who can say that a more targeted approach; i.e., treating individual plants or turf areas where beetle life stages are confirmed in lieu of blanket treatments of entire landscapes would not have had the same degree of success?

3) Some will argue that blanket spraying of all possible host plants is necessary to "mop up" what traps have missed. But it is impossible to keep a JB-lethal residue on every square inch of potential adult and larval habitat in complex suburban neighborhoods. Traps should be the first line of defense, combined with inspection and mapping followed with targeted applications of a reduced-risk insecticide IF beetles are confirmed on a given plant or site. Then follow up with trapping to confirm knockout or need for additional treatment. Traps are more likely to lure and kill outliers than haphazard spraying is to hit them.

SAP members – how would you feel about the CDFA crews blanket-spraying your home landscape a dozen or even 20 times or more? There is a better way. Please help the CDFA to develop a more sensible and sustainable program.

Daniel A. Potter
University Distinguished Professor of Entomology