

ESA SME Report (June 2018)
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Meeting with the Insecticide Resistance Action Committee (IRAC)

On May 17, 2018, I attended the IRAC meeting at CropLife America headquarters in WASH DC. I was given time for a presentation and I brought up four discussion areas that are germane to ESA membership and in particular educational and extension work. IRAC is composed of industry scientists who focus on insecticide resistance issues and funded by a consortium of agricultural and public health protection industries (<http://www.irac-online.org>). IRAC also provides grants to work on resistance issues of interest to the industry. For example, the Arthropod Pesticide Resistance database (<https://www.pesticideresistance.org/index.php>) at Michigan State University is partially funded by IRAC.

The first issue I raised with IRAC members was whether acaricide resistance in *Varroa* mites was of interest to industry, meaning is industry conducting any studies or funding studies at academic institutions. Members said the group was mostly focused on crop pests. However, Bayer CropSciences has an ‘animal health group’ and is focusing on technology termed “Beegate”. This group may have interests in the issue.

The second issue I brought up was a reiteration of ideas I had mentioned at their May meeting in 2017 about the importance of incorporating resistance management theory into IPM courses. I gave as an example two lectures that I developed for my “Ecological and Integrated Pest Management” at Washington State University. I talk about pesticide use in the latter third of my course as part of “therapeutic” management in contrast to “preventative” management. The first point I emphasize is the importance of ‘selectivity’ in pesticide activity and why it matters for protecting natural enemies and other non-target organisms in addition to variability in utility of any one insecticide class or subgroup on target organisms. Second, I talked about how resistance theory and management is incorporated into a lecture about limitations of pesticide use. I emphasized to the group that although most Entomology Departments in academia are focused on graduate training, we need to focus as much (if not more) on what we are teaching undergrads (who are mostly from other majors required to take entomology courses like IPM or related courses). I made the case that the undergrads are disproportionately the actual users (either directly or through management and supervision of other workers) of the various crop protection technologies and thus need to be aware of the aforementioned issues (i.e., understanding selectivity and resistance management). With regard to this idea of focusing on undergrad education, I raised the idea of conducting a U.S. wide survey of academic programs wherein an IPM type course is taught to determine how issues of selectivity and resistance management are delivered in coursework.

The third issue I raised was related to the idea of rotation of chemical use via differential modes of action. I questioned the extent of empirical proof that this management technique actually works under field conditions. I asked whether industry had compiled a bibliography of empirical studies, especially those under field conditions. The response suggested that little field work had been published, although one study on citrus thrips from the late 1980s was given as an example. A more common study was the use of modeling to predict the effect of mixtures vs sequential use of different modes of action chemicals. Another idea that the committee members raised was work on a “windows” idea. This management technique relied on using specific modes of action only at certain times of the year, presumably in correspondence to the phenology of specific pests in the agroecosystem.

A fourth issue I raised was the social pressure to abandon the use of neonicotinoid insecticides. I made the point that most of the studies focused on maize and canola (or in the EU, oil seed rape). While maize is certainly important owing to its vast acreage, neonicotinoids were not important in protection against the most important pests (the controversy over seed treatments notwithstanding). I mentioned that I had been studying the USDA PDP (Pesticide Data Program) residue database since its beginning report in 1993 to examine change in types of residues found on analyzed commodities. I’ve observed that the most common

commodities (i.e., various fruit and vegetables) routinely analyzed over many years show that OP insecticides are hardly ever detected but neonicotinoids and other comparatively newer compounds (for example, spinetoram and chlorantraniliprole) are much more frequently detected. The neonicotinoids for use on fruit and vegetables (disproportionately imidacloprid followed by acetamiprid and thiamethoxam) are important tools but they are also highly restricted by product label mandates that build in protection for pollinators. Yet, very few studies are published that focus on these types of crops and the use of neonics under realistic field conditions. I was trying to make the case that there are probably too many lab type studies and insufficient field studies, but the latter studies are expensive. Basically I was suggesting that industry ought to think about funding these types of studies to a greater degree to obtain a more realistic picture of how neonics are best used in crop protection and test the hypothesis that nontarget consequences are minimized.

Several EPA OPP staff attended the IRAC meeting after my presentation. One of the main ideas they brought up of interest to ESA members is their initiative on product label language with regard to resistance management. Pesticide Registration Notices (PRNs) were issued during 2017 on labeling, “Guidance for Pesticide Registrants on Pesticide Resistance Management Labeling” (PRN 2107-1) and “Guidance for Herbicide Resistance Management Labeling, Education, Training, and Stewardship” (PRN 2017-2) (download both from URL <https://www.epa.gov/pesticide-registration/pesticide-registration-notice-year>). EPA is trying not to “own” the resistance management labelling issue. The agency is bringing in stakeholders to determine the best practices. The agency emphasized that user “behavior” may be the biggest problem.

David Epstein from the USDA Office of Pest Management attended the IRAC meeting and suggested a symposium could be held at an ESA meeting on issues of resistance management, including the labelling aspects. I noted that often subject matter symposium about resistance tended to be reductionist, for example, modes of action or pharmacokinetics/pharmacodynamics related to resistance development. However, I suggested that a symposium with the theme of “implementation of management” and relationship to IPM based practices could have merit.

One EPA staff member asked about how we can best communicate about resistance management. I suggested that the State training programs for pesticide applicator licensing and recertification were perhaps the best places to talk about resistance theory and management. The idea was also raised for an interdisciplinary communication about resistance management from the ESA, WSSA (Weed Science Society of America), and the APS (American Phytopathological Society). EPA staff also mentioned that during July the FIFRA SAP (Scientific Advisory Panel) will be convening a meeting on lepidopteran resistance to *Bt*. A ‘white paper’ on the issue is in the ‘docket’.

Meeting with Staff at the EPA Office of Pesticide Programs (OPP)

During the afternoon I went to the EPA OPP headquarters in Crystal City for discussions with EPA EFED (Environmental Fate & Effects Division), BEAD (Biological & Economic Assessment Division), and PRD (Pesticide Registration Division) staff. I raised issues about neonicotinoid insecticide ecological risk assessments, especially the water assessments wherein a standard pond size typical of a midwestern Corn Belt farm was the prototypical water body that stood in for all aquatic habitats (including running streams). EPA EFED staff explained their rationale for continuing to use the static pond scenario.

I also asked about any coordination about neonicotinoids with Health Canada’s Pest Management Regulatory Agency (PMRA) on joint risk assessments. Staff said that the only interaction was about “bee issues”. We discussed the basic RA (risk assessment) tiered approach taken by the EPA as well as the types of the data they needed, especially by BEAD and PRD. One piece of information typically in short supply is information on actual usage, not just expressions of concern if a pesticide registration label is changed. The USDA funded IPM

Centers do not submit enough useful comments to help with the pesticide registration decision process.

Finally, I asked about what interaction EPA was having with the California EPA with regard to neonicotinoid insecticides. The message I heard was “not much”.

I’m informing the SPC that I have been requested by EPA to develop a webinar about how IPM can help resolve issues related to pollinator and butterfly protection. The webinar is tentatively scheduled for the last week in August. I am working on an outline for the presentation and will submit a slide set during the second week in August.