POTW Pesticides Annual Update

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Monthly meetings to guide pesticides work

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SFPUC

Susan Hiestand
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Melody LaBella
CCCSD

Debbie Phan
Water Board

Karin North
Palo Alto

Robert Wilson
Santa Rosa

Mary Cousins
BACWA
POTW Pesticides Conundrum

- 100s of Pesticides used and discharged
- Many pass through POTWs
- Some toxic as low as ng/L
- Toxicity in CA surface waters nearly always linked to current pesticides
- Potable reuse/RO Concentrate disposal challenge
- POTW treatment changes unrealistic
  - So many pesticides, such low concentrations!
- **State law prohibits local pesticide regulation**
Municipal wastewater has many uses – including as an upcoming water supply.

Continuous discharges

Sewer

Municipal wastewater treatment plant

Effluent

Irrigated with recycled water

Glass of water
Treated Wastewater (contains trace chemicals)

Reverse Osmosis (RO) Treatment

“RO Concentrate” (“RO reject”) Concentrates pollutants ~5 times

Larger persistent, mobile chemicals (e.g., imidacloprid, fiproles)

Smaller persistent mobile chemicals (e.g., 1,4-Dioxane, PFAS)

UV Disinfection & Advanced Oxidation

~80% of Flow

~20% of Flow

US EPA Pesticides Modeling, WateReuse, ACS & SETAC presentations highlight challenges pesticides pose for potable reuse
Pesticides in RO concentrate likely to exceed toxicity thresholds

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>RO Concentrate (ng/L)</th>
<th>Toxicity Threshold (ng/L)</th>
<th>Reduction Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imidacloprid</td>
<td>53 – 1080</td>
<td>10</td>
<td>81.1 – 99%</td>
</tr>
<tr>
<td>Fipronil</td>
<td>12 – 280</td>
<td>7.5</td>
<td>37.5 – 97.3%</td>
</tr>
<tr>
<td>Fipronil Sulfone</td>
<td>15 – 49</td>
<td>2.6</td>
<td>82.7 – 94.7%</td>
</tr>
<tr>
<td>Fipronil Sulfide</td>
<td>&lt;1 – 13.2</td>
<td>4.6</td>
<td>0 – 65%</td>
</tr>
<tr>
<td>Bifenthrin</td>
<td>5 – 50 (est.)</td>
<td>0.05</td>
<td>99 – 99.9% (est.)</td>
</tr>
<tr>
<td>Permethrin</td>
<td>5 – 100 (est.)</td>
<td>2.4</td>
<td>52 – 97.6% (est.)</td>
</tr>
<tr>
<td>Cypermethrin</td>
<td>&lt;1 – 85 (est.)</td>
<td>0.05</td>
<td>75 – 99.7%</td>
</tr>
</tbody>
</table>

Other pesticides that may exceed toxicity thresholds in RO concentrate

*Based on municipal wastewater effluent monitoring data*

- Carbaryl
- Chlorpyrifos
- Clothianidin
- Cyfluthrin
- Cypermethrin
- Deltamethrin
- Diazinon
- Diuron
- Esfenvalerate
- Imazapyr
- Lambda-cyhalothrin
- Propiconazole

*Most pesticides have not been monitored. Antimicrobials are the biggest data gap.*

Source: Effluent concentrations reported in Sutton et al 2019 x 5 compared to toxicity threshold from US EPA Office of Pesticide Programs (invertebrate Aquatic Life Benchmark or most sensitive invertebrate aquatic toxicity endpoint used in most recent risk assessment).
BAPPG/BACWA is being proactive on pesticides

**Monitoring partnerships (RMP, DPR)**
- Data → science-based pesticide regulatory programs

**Regulatory engagement (Pesticide workgroup)**
- Advocate POTWs be addressed
- Educate regulators about POTWs & CWA
- Formal = Letters to EPA/DPR
- Informal = Meetings & Science conferences
Regulatory Program Context

- Track pesticide registration schedule
- Evaluation of new pesticides
- Rank and prioritize pesticides
- Communicate with DPR and EPA
- Partner with CASQA and NACWA

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Pathway to success requires knowledge and persistence: a recent example

1. **WORKGROUP IDENTIFIES ISSUE**
   - Writes comment letter to EPA noting the lack of down-the-drain advisory warnings on indoor pyrethroid products.

2. **PARTIAL SUCCESS**
   - EPA adds down-the-drain advisory warning but uses a confusing pictogram for labels.

3. **WORKGROUP REACHES OUT TO LOCAL AGENCIES**
   - Writes another comment letter to EPA and gathers pictograms from Bay Area agencies.

### SUCCESS!
- EPA adds a down-the-drain advisory AND uses the pictogram that the workgroup suggested will be printed on more than one thousand labels!
BACWA’s suggested label language and pictogram will be on thousands of products across the country.

| Stewardship statement that includes a Spanish translation (Stewardship statement not required for products applied to pets) | Note to registrants: If adding stewardship statements on end-use consumer products, the followings language is required and placed in a prominent location:

For products without drain treatment uses:  
“Do not allow to enter indoor or outdoor drains”  
“No permita la entrada a desagües internos o externos.”

For products with drain treatment uses:  
“Do not allow to enter indoor or outdoor drains unless labeled for drain treatments.”  
“No permita la entrada a desagües internos o externos a menos que el etiquetado indique que está permitido el uso del producto para tratamiento de desagües.”

For products with and without drain treatment uses:  
“Follow proper disposal procedures on this label”  
“Siga las indicaciones del etiquetado para el deseche apropiado del producto.”

Graphic on the product package showing an image of a diagonal strikethrough over a drain. The pictogram must be legible (i.e. no smaller than 1.5 square centimeters or 0.25 square inches unless this size is greater than 10% of the size of the label).

**Use the following pictogram on product labels:**
Key 2020-2021 Regulatory Outcomes

• Reviewed >100 EPA science assessments; wrote > 20 comment letters to EPA
  • Pet flea control/Misc. indoor
    • Outcome: Small wins, but discouraging (pyrethroids, imidacloprid, fipronil, others)
  • Swimming pools/hot tubs/fountains (discharge language)
    • Outcome: Excellent; must contact local agency and follow discharge instructions

• Ongoing engagement with DPR and EPA

• Science: Journals/Conferences (limited)
  • DPR/Manufacturer/AVMA - Potable Reuse
BACWA Concerns-Specific to Flea and Tick Control

- Pesticides from common flea and tick control products are reaching the sewer systems.
- Pesticide concentrations subsequently discharged into San Francisco Bay can exceed toxicity thresholds for aquatic invertebrates.
- Flea/tick control pesticides appear to be the biggest barrier to disposal of the byproduct of advanced wastewater treatment to create potable water supply.
How Pet Treatments Travel to Sewer Systems and San Francisco Bay

1. Indoor Pet Flea Control Product
2. Washing of Pets, Hands, Pet Bedding, Floors, Carpets, and Clothing
3. Transport to Sanitary Sewer System
4. Discharge to Water Body, Recycled Water, and/or Biosolids
Pesticides of concern are those that exhibit aquatic toxicity and persist in the environment.

- Bifenthrin
- Deltamethrin
- Fipronil *
- Imidacloprid *
- Indoxacarb
- Permethrin

* Uses of fipronil and imidacloprid are currently under review by the California Department of Pesticide Regulation due to possible health risks posed to adults and children.
Focus on Fipronil

• Common “spot on” topical treatments
• Fipronil and degradates found in wastewater effluent sometimes at concentrations exceeding toxicity thresholds for sensitive aquatic organisms.
Fipronil is being evaluated by California’s Department of Pesticide Regulation

- DPR recently completed its Draft Fipronil (human) Risk Characterization Report
- Findings showed various adverse health effects
- Significant risks found for people who contact treated areas/pets after application of fipronil pet product
- Detailed analysis even considered risk of exposure from bathing pets who were treated with fipronil pet products
- Considering significant mitigation measures to reduce consumer and child exposure

BACWA’s Key Goal: to make sure that actions by the State avoid regrettable substitutions. For example, if one pesticide is banned by the State, another potentially more dangerous pesticide could replace it. It is best if categories of pesticides (i.e., pet flea treatments) are evaluated as a group instead of one-by-one.
BACWA’s Flea/Tick Control Outreach Messages

**Most Important**: mechanical controls (vacuuming, bed washing)

**Avoid**: topical collars and spot products

**Avoid**: fipronil, indoxacarb, imidaclorpid, bifenthrin, deltamethrin, and permethrin

**Consider**: talking to your vet about oral medication
BACWA Outreach Efforts

- Communication with CVMA
- Outreach to local VMAs
  - Provide newsletter articles
  - Speak at monthly meetings
- Social media campaigns
- Educational web pages

GIVE YOUR PUP FLEA AND TICK CHEWABLES!

CLICK HERE TO FIND OUT WHY
VETERINARY RESOURCES

Help Pet Owners Avoid Exposure to Toxic Chemicals in Topical Flea & Tick Control Products

*Indoor Pet Flea and Tick Treatments Leading to Environmental and Public Health Concerns*

To avoid exposing pets, their owners and Bay Area waterways to toxic pesticides, members of the Bay Area Clean Water Agencies (BACWA) are encouraging professionals to recommend their clients to use oral medications to control fleas and ticks, and to discourage the use of topical treatments.

There is increasing evidence that pesticides from external flea and tick control products including spot-on treatments, collars, indoor foggers and sprays are finding their way into our local waterways, sometimes at concentrations above toxicity thresholds for aquatic species. The California Department of Pesticide Regulation (DPR) is also currently reviewing uses of fipronil and imidacloprid, the active ingredients in most spot-on topical treatments, due to possible human health risks.

Web pages for vets:
AVMA Committee reached out to BACWA because of the Baywise.org vet page!

AVMA Committee on Environmental Issues

- Camille Fischer, DVM, local veterinarian
- Warren J. Hess, DVM, Assistant Director, AVMA Division of Animal and Public Health
- Judith Marteniuk, DVM, Professor Emeritus, Michigan State University
- Mike Murphy, DVM, Director of the AVMA Division of Animal and Public Health
- Tina Wismer, DVM, Senior Director, ASPCA Animal Poison Control Center
While we share our water quality concerns with AVMA, the dialogue has also enhanced our understanding of pet parasite control

• Pet parasite issues are highly complex.

• Some of our pesticides of concern may need to be a tool in the veterinarian’s toolkit (perhaps by prescription only)

• Ticks deserve thoughtful analysis and have different physical control messages
Unique opportunity to make connections...

• BACWA-Pesticides Workgroup jumped at the opportunity to foster relationship with AVMA on pet flea/tick product issues, focused on POTW issues

• Goal to expand that relationship
  • To connect AVMA with NACWA
  • To connect DPR with AVMA to discuss pet flea/tick product issues from the public health perspective
Key 2020-2021 Outreach outcomes

- Presentations at local vet association meetings
- Presentations at Vet Tech Community College classes
- Communications with the Environmental Issues Committee of national vet association (AVMA)
- Interviews published in national and international vet articles (VIN, JAVMA)
- Vet specific updates to baywise.org
FY 2021/2022 Recommended BACWA Priorities

1. DPR – Pet flea control mitigation
   - DPR Fipronil human risk characterization
     - Mitigation action likely in 2022/2023
   - Share information with DPR management
     - Not just fipronil – POTW needs – potable reuse challenges
   - Assemble non-scientific information for DPR
     - POTW costs & Water quality regulatory information

2. Veterinarians
   - Continue to build relationships
   - Enhance outreach messaging per AVMA recommendations
   - Explore NACWA partnership with AVMA

3. US EPA reviews
   - Uncertainty due to administration change (schedule/approach)
   - BACWA Priority - Fipronil mitigation
   - Continue swimming pools + root control effort
   - New info - EPA antimicrobials (“CECs”) reviews (the flood continues!)

4. Pesticides/CECs monitoring synergies
2021/2022 Challenges

- EPA changes – many unknowns
- DPR competing priorities
  - Budget/fees revision
  - Non-water initiatives
  - Our new “asks” of them (cumulative/alternatives)
- CASQA/Partner funding situation
2021/2022 OPPORTUNITIES

• Contractor team transition
  • Kelly Moran => SFEI

• Recently selected team:
  Stephanie Hughes and Tammy Qualls

• Potential NACWA/AVMA partnership
Future is Promising

- It’s a marathon – not a sprint
- Change will only occur with active POTW engagement
- POTW monitoring partnerships are crucial
Questions?
Extra slides
Antimicrobials – what are they?

EPA definition

An antimicrobial pesticide is intended to **disinfect**, **sanitize**, **reduce**, or **mitigate growth or development** of microbiological organisms or protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.
On-Pet Controls: Oral Medications

- Systemic
  - Requires adult flea to bite the animal
- Active ingredient in most are adulticides
  - The active ingredient in Program is an insect growth regulator
- Typically monthly or quarterly doses
- Although rare, adverse reactions can include vomiting, lethargy
- Prescription rather than OTC (therefore regulated by FDA, not EPA)
What about effectiveness of systemics versus topicals?

• Might systemics be more effective?
  • More accurate application method
  • More direct approach (flea bites animal rather than happens upon the topical application)
  • The active ingredient is within the pet’s bloodstream rather than being licked off or diluted around the home

"In this study systemically acting insecticides such as nitenpyram, and the topically applied but systemically active insecticide selamectin, were more effective in interfering with flea blood feeding than were imidacloprid and fipronil."

"Flea blood feeding patterns in cats treated with oral nitenpyram and the topical insecticides imidacloprid, fipronil and selamectin," McCoy, c., et al., Veterinary Parasitology, Vol. 156, pp 293-301, 2008."
Of course, the flea pyramid suggests that relying on on-pet treatments may not be most effective.

AVMA outreach materials highlight this issue

“Because much of the flea’s life cycle is spent off of your pet, treating only your pet will not eliminate the problem. If you kill the adult fleas and do not kill the eggs, larvae and pupae, your pet will become reinfested when these fleas become adults and the cycle will start all over again. Therefore, in addition to treating your pet, reduce the flea population in your house by thoroughly cleaning your pet’s sleeping quarters and vacuuming floors and furniture that your pet comes in contact with frequently. Careful and regular vacuuming/cleaning of the pet’s living area helps to remove and kill flea eggs, larvae, and pupae.”

American Veterinary Medical Association, "External Parasites" brochure from AVMA web site, January 2016.