Pet owners: Control fleas and ticks while protecting your family and the Bay

Stephanie Hughes and David Robertson

Santa Clara City Library
November 3, 2022

BACWA
BAY AREA
CLEAN WATER
AGENCIES

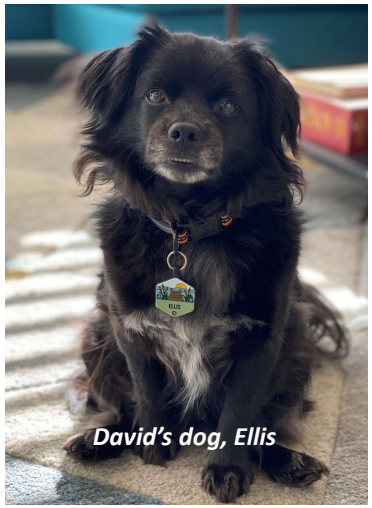
CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Environmental Services

Introduction to Your Speakers

Stephanie's dog, Beau

Stephanie Hughes is a registered professional Chemical Engineer with more than 25 years of experience in chemical fate and transport, water quality, and regulatory compliance. Stephanie provides consulting services and technical support to California local government agencies and is a Senior Lecturer in Environmental Science at Santa Clara University.



David's dog, Ellis

David Robertson is the Associate Environmental Services Specialist in the Sustainability and Compliance Division of the San José-Santa Clara Regional Wastewater Facility. David has a BS in Environmental Systems from UC San Diego.

Organizations involved in this project

- Bay Area Clean Water Agencies (BACWA)
- City of Palo Alto
- City of San Jose
- San Francisco Estuary Institute
- San Francisco Dept of Environment
- San Francisco Public Utilities Commission

Today's Topics

- Intro to wastewater treatment
- Your options for flea and tick control
- Our concerns about pesticidal options
- Alternatives to pesticides
- Resources for follow-up information


Where Does Our Water Go?
Untreated Wastewater
Recycled Water
Treated Wastewater
Stormwater
PIZZERIA
SCHOOL
Wastewater Facility
San Francisco Bay
SOUTH BAY WATER RECYCLING
San José-Santa Clara Regional Wastewater Facility
CITY OF SAN JOSE
Environmental Services
The City would like to thank the Santa Clara Valley Urban Runoff Pollution Prevention Program for their assistance on this flier.

There are 39 municipal wastewater treatment facilities in the Bay Area…



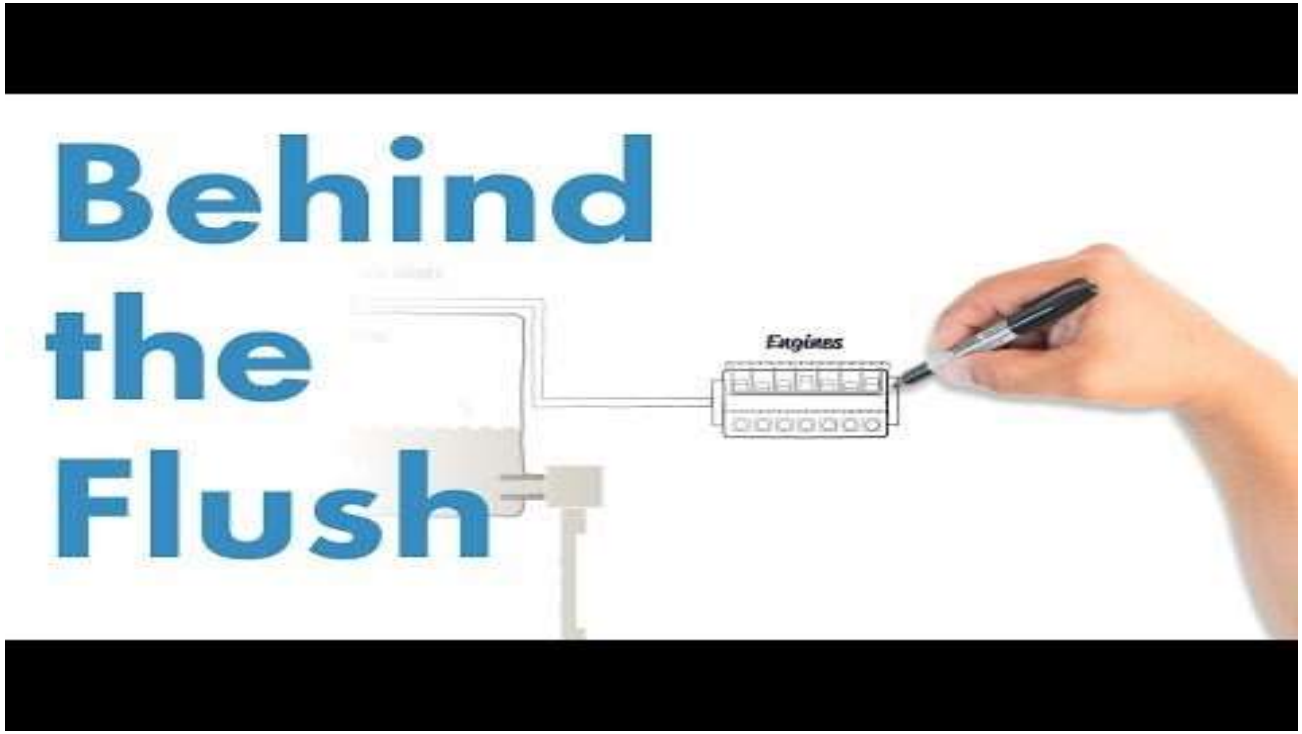


…that treat **500,000,000 gallons** of wastewater every **day** from homes, industry and businesses

*…and discharge the treated water into **San Francisco Bay!***

The San Jose – Santa Clara Regional Wastewater Facility

A brief primer on wastewater treatment



The San Jose – Santa Clara Regional Wastewater Facility

SEH20
SEH21

*"Conventional **wastewater treatment technologies are generally ineffective at removing pesticides from wastewater…"***

*"seven compounds… were detected in treated wastewater effluent at **levels exceeding** U.S. Environmental Protection Agency (US EPA) **aquatic life benchmarks for chronic exposure to invertebrates**."*

Sutton et al. (2019). "*Occurrence and Sources of Pesticides to Urban Wastewater and the Environment*" in Goh et al.; Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management ACS Symposium Series; American Chemical Society: Washington, DC, 2019.

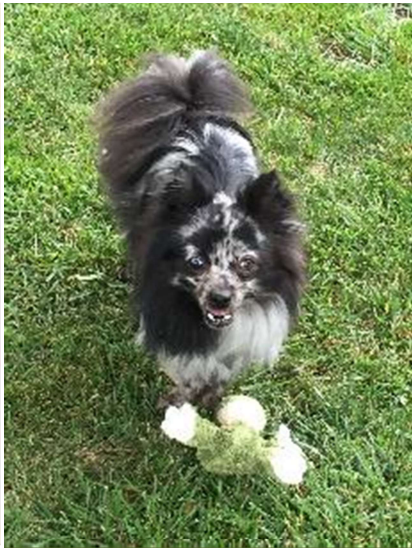
Slide 10

SEH20 maybe something from Sadaria paper instead about these being pesticides from pet flea control
SHughes, 10/26/2022

SEH21 the second sentence could sound problematic; but the sadaria paper has a sentence
SHughes, 10/26/2022

Questions?

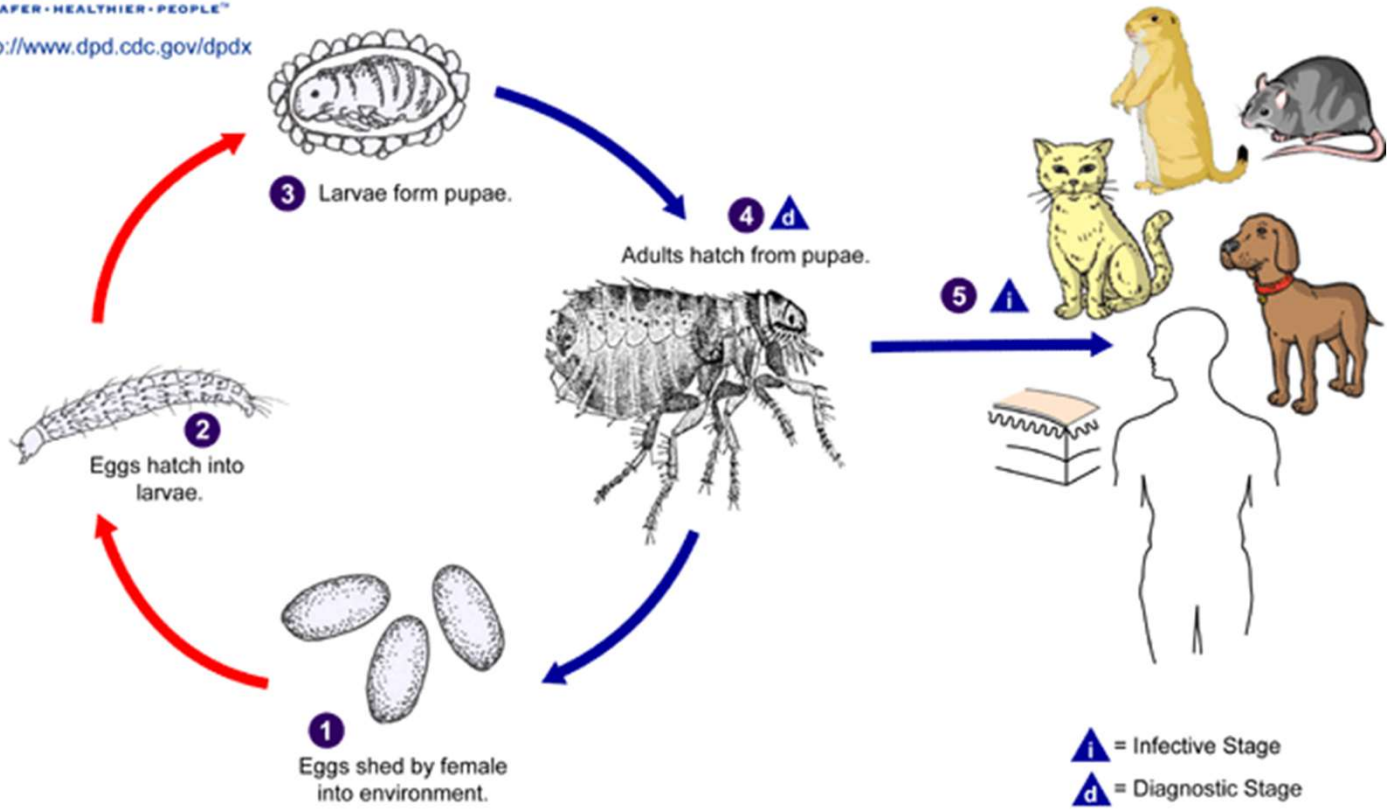




Then we'll return to protecting our pets!

Let's focus on the flea cycle

http://www.dpd.cdc.gov/dpdx

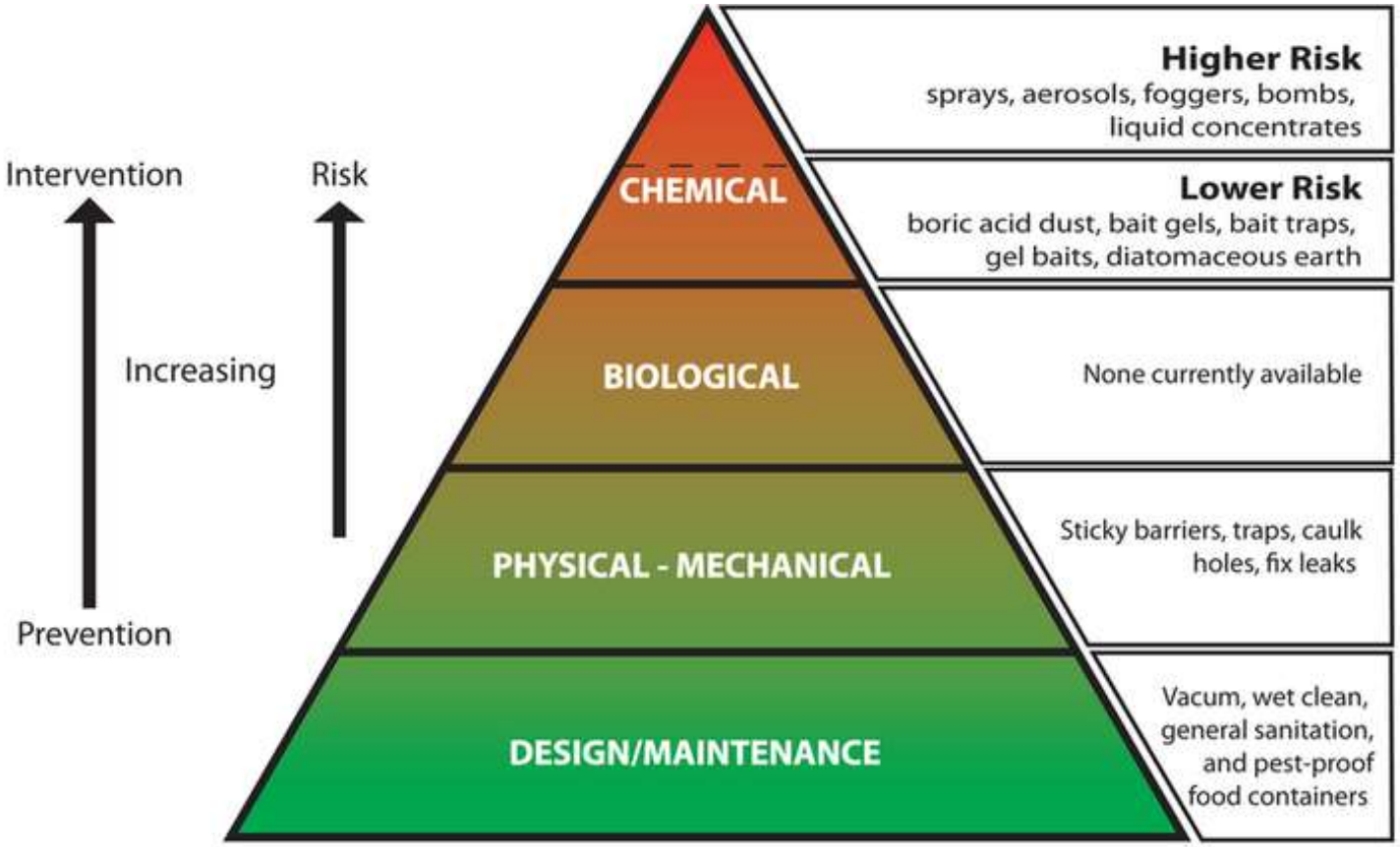


https://www.pesticideresearch.com/site/?page_id=2933

What options are available for flea control?

Please type in the chat some methods you have used or are aware of for flea control.

There is a powerful concept for indoor pest control: integrated pest management (IPM)



https://ento.psu.edu/outreach/extension/ipm/english/about-1/what-is-ipm

In this context, what options do we have for flea and tick control?

Using foggers exposes people to pesticide residue

ELSEVIER

Chemosphere

Volume 20, Issues 3–4, 1990, Pages 349-360

Measuring potential dermal transfer of surface pesticide residue generated from indoor fogger use: An interim report

J. Ross*, T. Thongsinthusak, H.R. Fong, S. Margetich, R. Krieger

Journal of Exposure Analysis and Environmental Epidemiology (2003) 13, 112–119

www.nature.com/jea

Human exposure to indoor residential cyfluthrin residues during a structured activity program

RYAN L. WILLIAMS, CRAIG E. BERNARD, AND ROBERT I. KRIEGER

Personal Chemical Exposure Program, Department of Entomology, and Environmental Toxicology Graduate Program, University of California, Riverside, California, USA

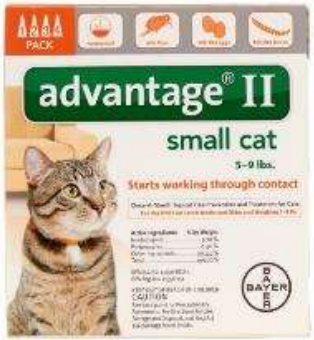
Collars work topically

- Work topically on the fur/skin
- The active ingredient permeates slowly out of the collar over time
  - Collars may release the active ingredient during storage so that when it is first applied to the pet, it initially exposes the pet to a large initial dose of the active ingredient.

"Long-Acting Control of Ectoparasites: A Review of Collar Technologies for Companion Animals," Witchey-Lakshmanan, L., Advanced Drug Delivery Reviews, 1999, Vol 38, pp 113–122.

How (Most) Topical Spot-Ons Work

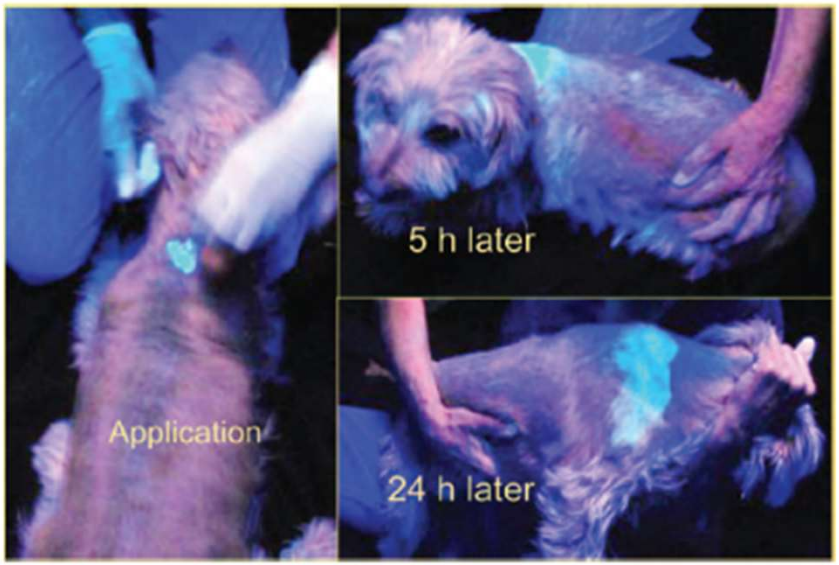
- Work topically on the fur/skin
- Often 2 or 3 active ingredients
- According to manufacturers, they don't wash off
  - But they do!



Revolution is an example of a topical treatment that works systemically

- It is **applied topically** but **works as a systemic** (like oral medications)
  - Also protects against some internal parasites
- Some of the active ingredient remains on the skin/ fur (and has topical / contact impact)

Topical treatments do not remain on the pet



Researchers incorporated a fluorescent dye into the spot treatment to photograph the spread.

Fig. 3. Handling of a dog treated with Frontline® containing 1% Tinopal® CBS-X fluorescent tracer revealed contamination of hands during routine application and handling of a treated dog (color figure available online).

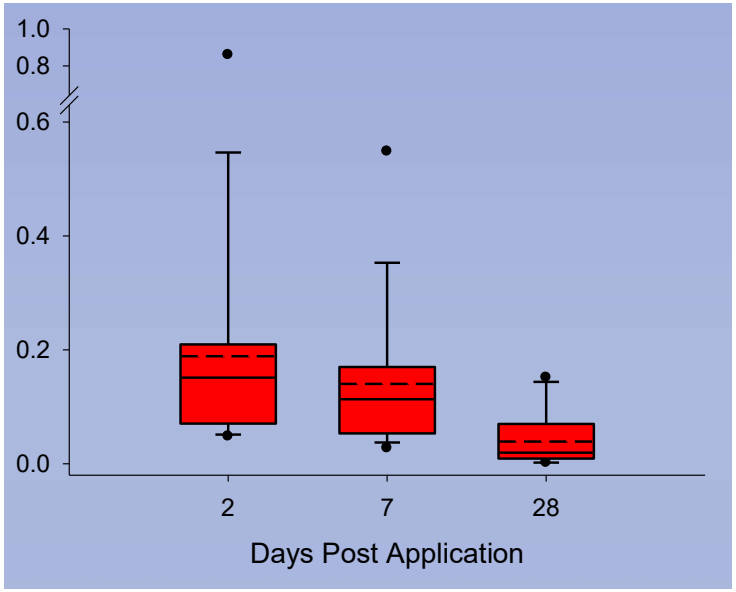
"Fate and Distribution of Fipronil on Companion Animals and in Their Indoor Residences Following Spot-On Flea Treatments," Bigelow Dyk, M., et al., J. of Env Science and Health, Part B, 2012, Vol 47, pp 913-924.

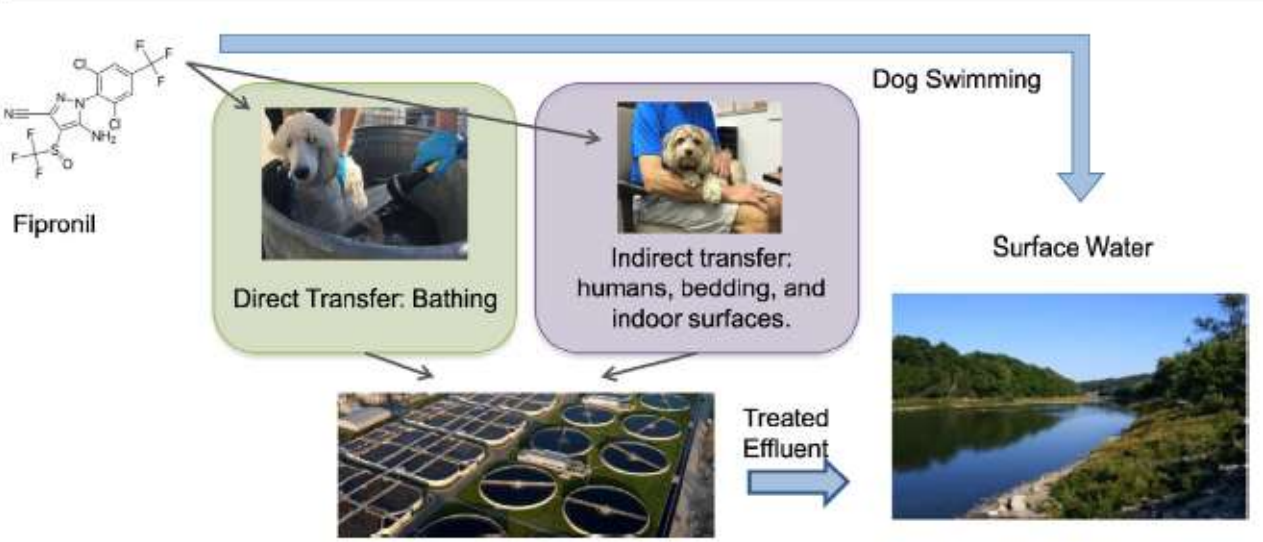
Spot-on products typically state that they are waterproof once dry

Fipronil washoff to municipal wastewater from dogs treated with spot-on products

Jennifer Teerlink [a,*], Jorge Hernandez [b], Robert Budd [a]

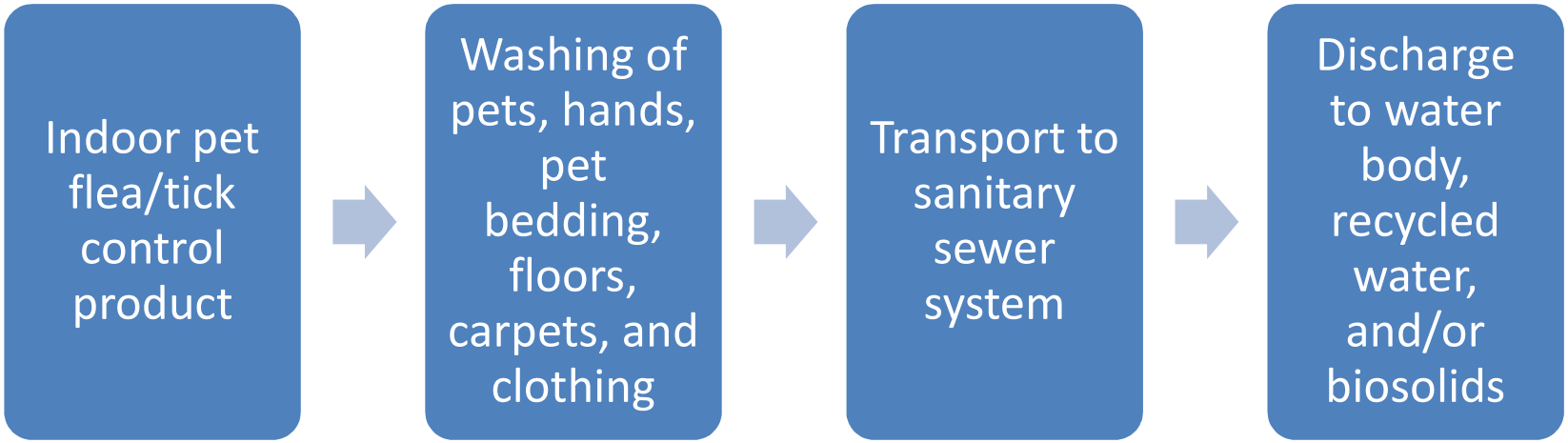
[a] Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA 95812, USA
[b] California Department of Food and Agriculture, Sacramento, CA 95812, USA





Source: Teerlink, J., J Hernandez, R Budd. 2017. Fipronil washoff to municipal wastewater from dogs treated with spot-on products. Sci Total Environ 599-600: 960-966.

These On-Pet and Indoor Flea/Tick Treatments Travel to Sewer Systems and San Francisco Bay

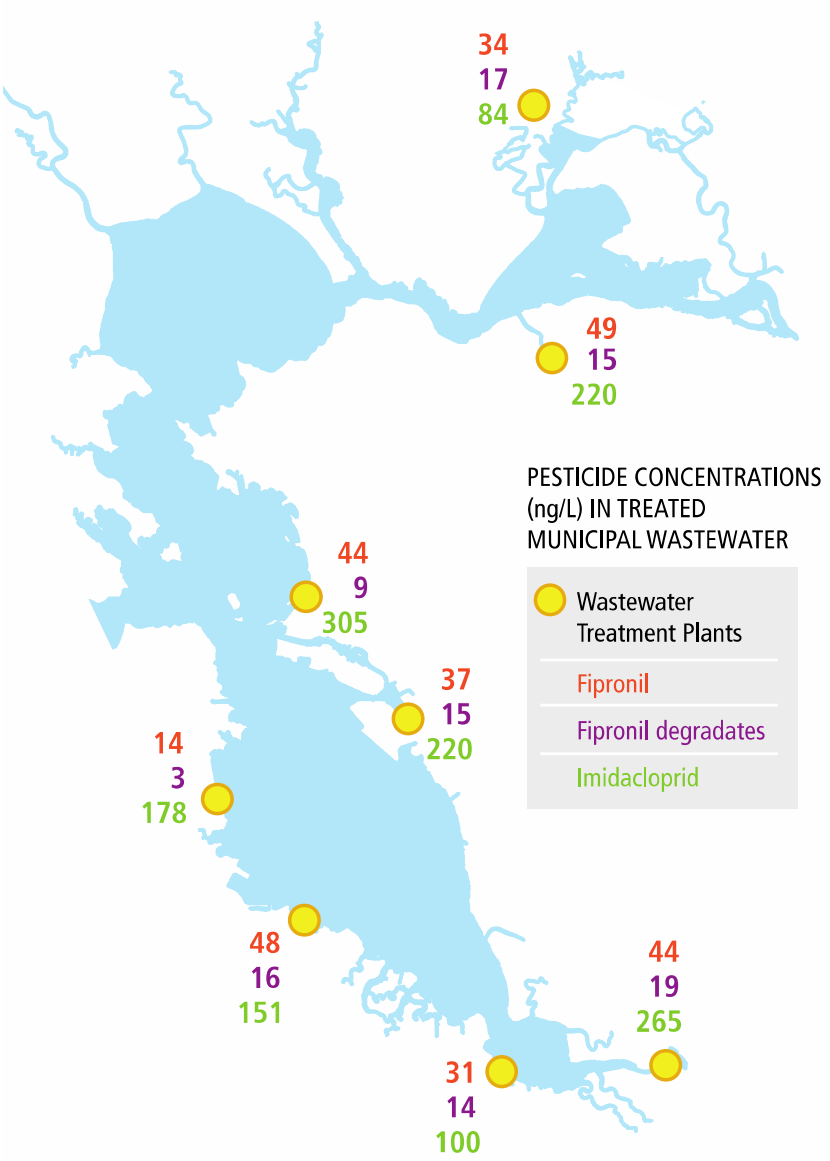


Pesticides of concern are those that exhibit aquatic toxicity and persist in the environment

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

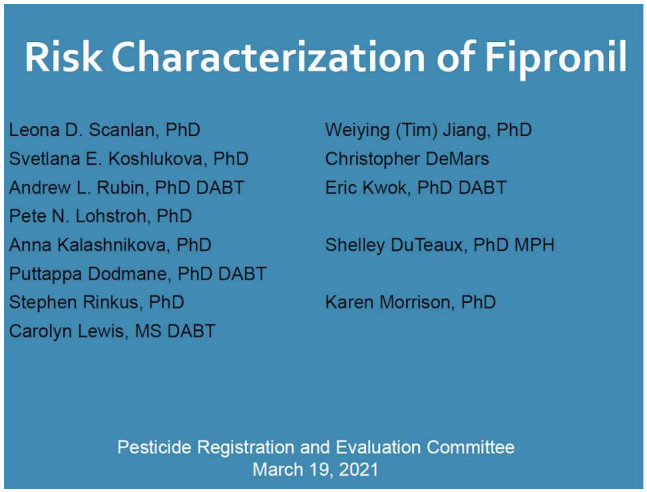
We have evidence that on-pet pesticides pass through wastewater treatment at **concentrations above toxicity thresholds** for sensitive organisms

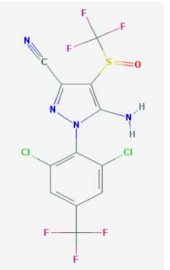
Aquatic toxicity thresholds:
11 ng/L for fipronil
10 ng/L for imidacloprid



Sadaria, A.M. et al. 2017. Passage of Fiproles and Imidacloprid from Urban Pest Control Uses Through Wastewater Treatment Plants in Northern California. *Environmental Toxicology and Chemistry*. 36 (6), 1473-1482.

California's Department of Pesticide Regulation is studying the human health risks associated with **fipronil** exposure





*"Scenarios that pose a **potential risk** to home users include:*

- *Acute **dermal exposure for users who apply pet spray** at home*

*Post-application **residential exposures for adults** considered to pose a **potential health risk** include:*

- *Seasonal **exposure to pet spray and pet spot-on products***

*Post-application residential exposure for **children** considered to pose a potential health risk include:*

- *Short-term oral exposure to turf granules*
- *Seasonal **oral exposure to pet products***
- *Seasonal **dermal exposure to pet products**"*

Fipronil Risk Characterization Document, Draft, Human Health Assessment Branch, Department of Pesticide Regulation, California Environmental Protection Agency. January 2021.

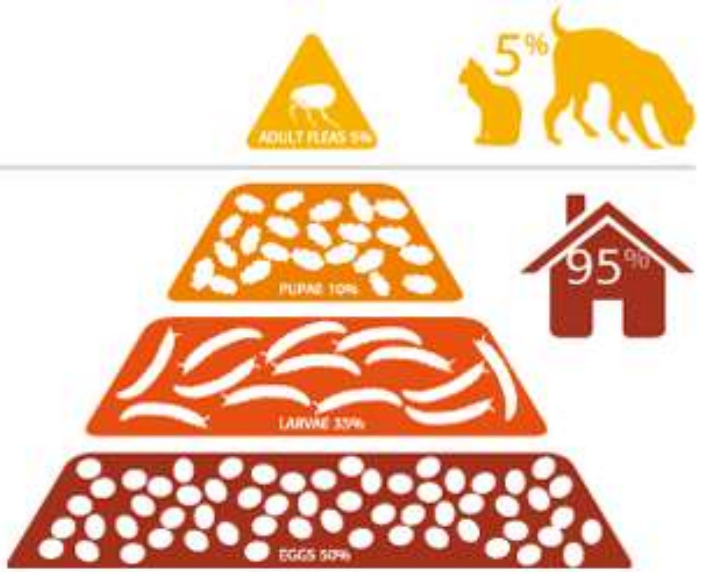
Concerns with Pesticides for Flea and Tick Control

- Pesticides from common flea and tick control products are reaching the sewer systems.
- Pesticides subsequently discharged into San Francisco Bay can exceed toxicity thresholds for aquatic life.
- CA's Dept of Pesticide Regulation has identified potential human health risks associated with fipronil, a common topical.

What are the alternatives?

Let's look at the flea cycle another way

- Adult fleas only account for **5%** of the total flea population.
- The other **95%** are the **eggs, larvae and pupae** that remain hidden in carpets, furniture, dog bedding and the garden, waiting to develop and jump onto the dog.



The majority of the flea cycle is the "environmental reservoir" within and throughout your home.

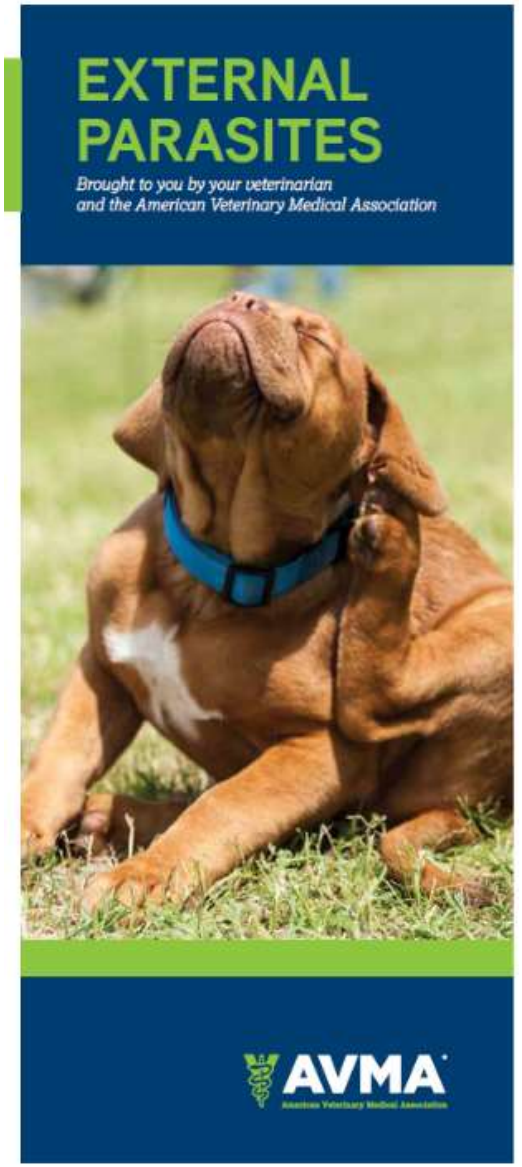
http://www.allcreaturesvet.biz/fleas.html

The American Veterinary Medical Association presents one solution

"Because much of the flea's life cycle is spent off of your pet, ***treating only your pet will not eliminate the problem****. ….*

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.



That returns us to the IPM Pyramid

Using IPM for Flea Control

1. **Prevent**: vacuum (everywhere and often!), wash bedding, steam clean
2. **Monitor:** flea combs, flea traps

https://www.preventivevet.com/pets/how-to-get-rid-of-fleas-in-your-home

https://www.ecats.vet/siteSearch/view/225302_Fleas.pml

https://www.instructables.com/Simple-Flea-Trap/

Similarly for ticks…prevention via physical control is the key

1. If possible, **keep your dog's coat short**.
2. **Try to keep out of the brush.**
3. **Thoroughly inspect your pet** after walks. Pay particular attention to the nose, mouth, eyes, ears (inside too), around tails and under the collar.
4. **Seek to create a tick-free zone in your yard**, controlling brush or tall grass.

When prevention and monitoring are not enough

Consider talking to your vet about oral medication

On-Pet Controls: Oral Medications

- Systemic
  - Requires adult flea to bite the animal
- Typically monthly or quarterly doses
- Prescription rather than over the counter
- Some also protect against heartworm and/or other internal parasites
  - Reducing number of monthly medications

Evidence suggests that systemics may be more effective than topicals

- Why? Hypotheses include:
  - More accurate application method
  - More direct approach (pest bites animal rather than happens upon the topical on the skin or fur)
  - The active ingredient is not being licked off or diluted around the home

"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.

Summary

- Scientific evidence shows that pesticides from indoor flea treatments transport around the home (and wash off)
- These pesticides travel through the sewer system and wastewater treatment plant
- These pesticides have been observed in wastewater effluent at concentrations that exceed EPA aquatic toxicity thresholds
- Indoor use of fipronil has been identified as a possible risk to human health
- Better options are to prevent and monitor fleas/ticks and talk to your vet about chewables

For more information: www.baywise.org:

ABOUT

This website is a project of the **Bay Area Clean Water Agen**
prevention committee known as the Bay Area Pollution P
come together with stormwater agencies to educate Bay A
about simple, cost-effective ways to protect San Francisco

ABOUT ARTICLES

Thank you for your attention!

David Robertson
San José-Santa Clara Regional Wastewater Facility
David.Robertson@sanjoseca.gov
408.635.4033

Stephanie Hughes, P.E.
Santa Clara University
sehughes@scu.edu

Questions?


LOVE YOUR PET
and THE BAY.
sjenvironment.org/flea
Switch to chewable flea
and tick meds today.
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FOR MORE INFO:
Choose
Chewables!