



Florida Department of Environmental Protection

Surface Water Pesticide Monitoring

March 29, 2016





Outline

- Define what are pesticides, who regulates pesticides, why are we testing for pesticides.
- Where we tested and what are the results



Why are we testing?

- To evaluate if the precautions in the Florida registration process is working
- To check if pesticides detected in other states are detectable in Florida



Who tests for pesticides?

- FDACS – Ground Water – Lake Wales Ridge Monitoring Network
- FDoH – Private Drinking Water Wells (edb)
- SWFWMD – Canals
- USGS – NAWQA
- Municipal Drinking Water Systems



What are Pesticides?

U.S. Code Title 7, Chapter 6, Subchapter II, Section 1

The term "pest" means (1) any insect, rodent, nematode, fungus, weed, or (2) any other form of terrestrial or aquatic plant or animal life or virus, bacteria, or other micro-organism (except viruses, bacteria, or other micro-organisms on or in living man or other living animals)

The term "pesticide" means (1) any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, (2) any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant, and (3) any nitrogen stabilizer



- Algicides**

Control algae in lakes, canals, swimming pools, water tanks, and other sites.

- Antifouling agents**

Kill or repel organisms that attach to underwater surfaces, such as boat bottoms.

- Antimicrobials**

Kill microorganisms (such as bacteria and viruses).

- Attractants**

Attract pests (for example, to lure an insect or rodent to a trap). (However, food is not considered a pesticide when used as an attractant.)

- Biocides Microbial pesticides**

Microorganisms that kill, inhibit, or out compete pests, including insects or other microorganisms.





- Defoliants**

Cause leaves or other foliage to drop from a plant, usually to facilitate harvest.

- Disinfectants and sanitizers**

Kill or inactivate disease-producing microorganisms on inanimate objects.

- Fungicides**

Kill fungi (including blights, mildews, molds, and rusts).

- Fumigants**

Produce gas or vapor intended to destroy pests in buildings or soil.

- Herbicides**

Kill weeds and other plants that grow where they are not wanted.

- Insecticides**

Kill insects and other arthropods.

- Miticides (also called acaricides)**

Kill mites that feed on plants and animals.





- Molluscicides**

Kill snails and slugs.

- Nematicides**

Kill nematodes (microscopic, worm-like organisms that feed on plant roots).

- Ovicides**

Kill eggs of insects and mites.

- Pheromones**

Biochemicals used to disrupt the mating behavior of insects.

- Repellents**

Repel pests, including insects (such as mosquitoes) and birds.

- Rodenticides**

Control mice and other rodents





Active Ingredients

- Active ingredients are the chemicals in a pesticide product that act to control the pests. Active ingredients must be identified by name on the pesticide product's label together with its percentage by weight.

ACTIVE INGREDIENT:

Permethrin: [*3-Phenoxyphenyl methyl
(±) cis/trans 3-(2,2-dichloroethyl)-2,2-
dimethylcyclopropanecarboxylate] 2.5%

OTHER INGREDIENTS 97.5%
Total 100.0%

*cis/trans isomer ratio: Min 35% (±) cis
Max 65% (±) trans

KEEP OUT OF REACH OF CHILDREN

CAUTION See Booklet For Additional
Precautionary Statements



Types of Active Ingredients

- Conventional – all ingredients other than biological pesticides.
- Biopesticides – ingredients derived from certain natural materials (viruses)



Common Name vs. Trade Name

- Glyphosate vs. Roundup[®]
- Hydromethylnon vs. Amdro[®]
- Fluridone vs. Sonar[®]
- Sodium hypochlorite vs. Clorox[®]
- Glyphosate vs. 2-[(phosphonomethyl)amino]acetic acid



Legal Authority

- U.S. EPA

Office of Water – Clean Water Act (CWA)

Office of Pesticide Programs (OPP) – Federal
Insecticide, Fungicide, and Rodenticide Registration
Act (FIFRA)

FEDERAL PESTICIDE REGISTRATIONS



Legal Authority



- FL Dept. of Agriculture and Consumer Services
Div. of Agricultural Environmental Svcs

(not to be confused with Ofc of Ag Water Policy)

- State registration of pesticides (allows the sale)
- Licensing (to be able to apply “restricted use pesticides)
- Enforcement (for mis-applications of pesticides)
- FL Dept. of Environmental Protection
 - Water Quality



Process

- Develop an analyte “wish list.” Emphasis is on currently used pesticides, not legacy pesticides. (multi-Agency)
- Learn where SMP will be sampling for nutrients and or copper
- Select 15 to 25 water bodies that are surrounded by land uses that utilize pesticides (multi-Agency)
- Forward WBID “wish list”
- Samples Collected (the hard part), samples tested
- Data retrieved in February from LIMS
- Annual Report Generated (multi-Agency)
- Rinse and repeat



Where Pesticides were Tested

15 WBIDS statewide

Distributed equally amongst each DEP District



What was found

Detection limits were very low.

Detections were frequent.

None of the detections exceeded EPA Aquatic Life Benchmarks (nearly all were 100 times lower than benchmarks)



Atrazine

Detected in 98 % of samples.

Routinely detected in US in both SW and GW

Used on lawns and recreational turf (approved application rate has been reduced)

75% of corn acreage is treated with atrazine



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- Detected in 71 % of samples

Common herbicide



Bromacil

- Detected in 42% of samples

Herbicide commonly used in bedded Citrus



Fipronil

- Detected in 79% of samples (including degradates)
- **Came closest to exceeding benchmark.** Detection of 0.012 ug/L. Chronic invertebrate benchmark 0.037 ug/L.
- Insecticide first used in flea collars (Frontline), now used for fireant control and termites (Termidor)
- Binds tightly to soil particles.
- Only been used for past 15 years



Hexazinone

- Detected in 51% of samples
- Herbicide used in rangeland and forested areas to control understory hardwood (Krovar)



Imidacloprid

- Detected in 67 % of samples
- Insecticide used in agriculture



Other Pesticides of Interest

- Glyphosate (aka “Roundup”) – only one detection, 12 ug/L. MDL 5 ug/L. Lowest benchmark is 1,800
- Fluridone (aka “Sonar”) – 55% detections. Highest was 0.17 ug/L. Lowest benchmark is 5.78 ug/L (plants)
- Malathion – 7 % detections. Highest was 0.021 ug/L. Lowest benchmark 0.3 ug/L.



Summary

- High frequency of atrazine detections indicate that samples are collected in pesticide use areas.
- Detections are frequent, but at very low levels.