

1. Study highlights

- Study Number: 310
- Title: Northern California Agricultural Monitoring
- Author: Scott D. Wagner

- Study area: County: Colusa, Solano, Yolo, Yuba
 Waterbody/ Watershed: Lower Logan Creek, Willow Creek, Colusa Drain, Jack Slough, Clarks Ditch- Colusa Basin Drain, Gibson Canyon Creek-Sweany Creek

- Land Use Type: Ag Urban Forested Mixed Other

- Water body type: Storm drain outfall Creek River Pond Lake
 Drainage ditch Other: type

- Objectives: 1. Prioritize pesticide monitoring candidates based on current use reports at the watershed level; 2. Determine the presence and concentrations of prioritized pesticide active ingredients in surface waters in the selected monitoring regions; 3. Analyze chemistry data to evaluate potential impacts on aquatic life

- Sampling period: July 2017 – September 2017

- Pesticides monitored:
 Abamectin, Atrazine, Azoxystrobin, Benfluralin, Bifenthrin, Carbaryl, Chlorantraniliprole, Chlorpyrifos, Cypermethrin, Cyprodinil, Diazinon, Diflubenzuron, Dimethoate, Diuron, Esfenvalerate/fenvalerate, Ethalfluralin, Hexazinone, Imidacloprid, Lambda-Cyhalothrin, Malathion, Methidathion, Oryzalin, Oxyfluorfen, Pendimethalin, Permethrin, Prodiamine, Propanil, Propiconazole, Pyraclostrobin, Pyriproxyfen, Quinoxifen, Simazine, S-metolachlor, Thiobencarb, Trifloxystrobin, Trifluralin

- Major findings:
 Water samples collected from Colusa, Solano, Yolo, and Yuba counties were monitored for 37 active ingredients (A.I.s) at ten agricultural field sites in July and September of 2017. A.I.s included herbicides, fungicides and insecticides of high use for these particular areas. The most frequently detected A.I.s were azoxystrobin (70%) and thiobencarb (65%); neither exceeded their lowest U.S. Environmental Protection Agency (USEPA) aquatic benchmark values. Among the pesticides detected, bifenthrin, diflubenzuron, permethrin, and S-metolachlor/metolachlor exceeded the lowest EPA aquatic life benchmark.

- Recommendations for pesticides that need a CDFA analytical method (from SWMP):

Thiamethoxam, Clothianidin, Dinotefuran

2. Pesticide detection frequency

Table 1. Pesticides detected in water. Complete data set in Appendix IV.

Pesticide	Number of samples	Number of detections	Reporting Limit (µg/L)	Detection frequency (%)	Lowest USEPA benchmark (BM) (µg/L)*	Number of BM exceedances	BM exceedance frequency (%)
Abamectin	20	0	0.02	0	0.17 IA	0	0
Atrazine	20	0	0.02	0	<1 NVA	0	0
Azoxystrobin	20	14	0.02	70	44 IC	0	0
Benfluralin	20	0	0.05	0	1.9 FC	0	0
Bifenthrin	20	2	0.001	10	0.0013 IC	2	10
Carbaryl	20	5	0.02	25	0.5 IC	0	0
Chlorantraniliprole	20	10	0.02	50	4.4 IC	0	0
Chlorpyrifos	20	0	0.02	0	0.04 IC	0	0
Cypermethrin	20	1	0.005	5	0.069 IC	0	0
Cyprodinil	20	0	0.02	0	8 IC	0	0
Diazinon	20	0	0.02	0	0.105 IA	0	0
Diflubenzuron	20	1	0.02	5	0.00025 IC	1	5
Dimethoate	20	1	0.02	5	0.5 IC	0	0
Diuron	20	4	0.02	20	2.4 NVA	0	0
Esfenvalerate/fen.	20	0	0.005	0	0.017 IC	0	0
Ethalfuralin	20	0	0.05	0	0.4 FC	0	0
Hexazinone	20	0	0.02	0	7 NVA	0	0
Imidacloprid	20	0	0.02	0	0.01 IC	0	0
Lambda-cyhalothrin	20	0	0.002	0	0.002 IC	0	0
Malathion	20	0	0.02	0	0.049 IA	0	0
Methidathion	20	0	0.02	0	0.66 IC	0	0
Oryzalin	20	0	0.05	0	13 VA	0	0
Oxyfluorfen	20	0	0.05	0	0.29 NVA	0	0
Pendimethalin	20	3	0.05	15	5.2 NVA	0	0
Permethrin	20	1	0.002	5	0.0014 IC	1	5
Prodiamine	20	0	0.05	0	1.5 IC	0	0
Propanil	20	5	0.02	25	9.1 FC	0	0
Propiconazole	20	4	0.02	20	21 NVA	0	0
Pyraclostrobin	20	0	0.02	0	1.5 NVA	0	0
Pyriproxyfen	20	0	0.02	0	0.015 IC	0	0
Quinoxifen	10	0	0.02	0	13 FC	0	0
Simazine	20	0	0.02	0	2.24 NVA	0	0
S-Metolachlor/Metolachlor	20	5	0.02	25	1 IC	1	5
Thiobencarb	20	13	0.02	65	1 IC	0	0
Trifloxystrobin	20	0	0.02	0	2.76 IC	0	0
Trifluralin	20	0	0.05	0	1.9 FC	0	0

*FA, fish acute; FC, fish chronic; IA, invertebrate acute; IC, invertebrate chronic; NVA, non-vascular acute; VA, vascular acute; NA, benchmark not available

3. Tracking Benchmark Exceedances (BME) or Sediment Toxicity (TU)

Table 2. For further data analysis: pesticides that have $\geq 10\%$ aquatic benchmark exceedances [BME] [Table 1] or ≥ 1 sediment toxicity units [TU] [Table 2]) for 3 consecutive years are recommended for further detailed data analysis (Ambient Urban Monitoring Strategy SOP [<http://cdpr.ca.gov/docs/emon/pubs/protocol.htm?filter=surfwater>])

BME (for pesticides with $\geq 10\%$ BME) or Sediment TUs (for pesticides with ≥ 1 Sediment TU) (all sites) for the past 5 years							Last written evaluation (reference)	Further data analysis (Y/N)
Area	Pesticide	Water	Sediment	Current year (i)	i - 1	i - 2		
Sacramento Valley	Bifenthrin	X		10				N
	Diflubenzuron	X		5				N
	Permethrin	X		5				N
	S-metolachlor/metolachlor	X		5				N

4. QC

Table 3. Laboratory Quality Control (QC) Summary

QC Type	Water Samples		Sediment Samples	
	Total Number	Number of QC out of control	Total Number	Number of QC out of control
Lab Blanks	8	0	Enter No.	Enter No.
Matrix Spikes/Duplicates	8	0	Enter No.	Enter No.
Laboratory Control Spikes/Duplicates	0	0	Enter No.	Enter No.
Blind Spikes	4	0	Enter No.	Enter No.
Surrogate Spikes	20	0	Enter No.	Enter No.
Other QC: Field Blank	1	0	Enter No.	Enter No.
Explain out of control QC and interpretation of data:	Click here to enter other QC information or comments			

5. Supporting Information

Submit the following Supporting Information combined into one PDF file with your report:

Index of Supporting Information

Appendix I. Study protocol

Appendix II. Sampling site information and pictures

Appendix III. Water quality data

Appendix IV. Water or sediment monitoring data

Appendix V. Analytical methods