

AMBIENT MONITORING REPORT

Date: June 5, 2015

1. Study highlights:

- Study Number: 290
- Title: Surface Water Monitoring for Pesticides in Agricultural Areas of California, 2014
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- Study area: County: Monterey, San Luis Obispo, Santa Barbara, Imperial, Riverside
 Waterbody/ Watershed: Salinas River, Old Salinas River, Santa Maria River, New River, Alamo River, Colorado River, Salton Sea

- Land Use Type: Ag Urban Forested Mixed Other

- Water body type: Storm drain outfall Creek River Pond Lake
 Drainage ditch Other: [Click here to enter describe other](#)

- Objectives: 1. Determine pesticide presence and their concentrations in surfacewater runoff from agricultural areas of high pesticide uses; 2. Compare pesticide concentrations to the lowest US EPA aquatic life benchmarks; 3. Determine the toxicity of a subset samples to *Hyaella azteca* and *Chironomus dilutus* in 10 days water column testing.

- Sampling period: March, 2014 – October, 2014

- Pesticides monitored:
 Chlorpyrifos, Diazinon, Dimethoate, Malathion, Methidathion, Methomyl, Methoxyfenozide, Tebufenozide, Imidacloprid, Bifenthrin, λ-cyhalothrin, Cyfluthrin, Cypermethrin, Fenvalerate/Esfenvalerate, Permethrin, Bensulide, Benfluralin, Ethalfluralin, Oryzalin, Pendimethalin, Prodiamine, Trifluralin, Oxyfluorfen, Chlorothalonil

- Major findings:
 INSECTICIDES. Imidacloprid, methomyl and methoxyfenozide were the three insecticides with high detection frequencies (DF) (69-88%). Four organophosphates including chlorpyrifos, diazinon, dimethoate and malathion were detected at 22-30% DF. DFs for pyrethroids varied from 0-43%. Bifenthrin was the most frequently detected pyrethroid (43% DF), followed by permethrin (32% DF) and λ-cyhalothrin (19% DF). No detections were reported for methidathion, tebufenozide, cyfluthrin, cypermethrin. As for the aquatic life benchmark (BM) exceedances, bifenthrin had the highest frequency (41%) exceeding their lowest BMs, followed by permethrin (32%) and λ-cyhalothrin (19%). Chlorpyrifos, malathion, methomyl and imidacloprid had the exceedance frequencies of 18-24%. No diazinon samples had detected concentrations exceeding its lowest BM.

HERBICIDES AND FUNGICIDES. The herbicide and fungicide with the highest DF were bensulide (55%) and azoxystrobin (59%), followed by pyraclostrobin (31%), pendimethalin (29%), oxyfluorfen (36%) and trifluralin (18%). There was only one chlorothalonil sample with a measurable concentration. No detections were reported for the rest of the herbicides and fungicides. Oxyfluorfen was the only herbicide that had one sample with the concentration exceeding its lowest BM.

The 10-day toxicity tests were conducted for water samples collected from 17 locations in Monterey, Santa Barbara and Imperial counties in September and October 2014. Two species (*Hyaella azteca* and *Chironomus dilutus*) were used as testing species. 13 of 17 samples caused significant toxicity to *H. azteca* with the survivals ranging from 0 to 59% and 9 samples had significant toxicity to *C. dilutus* with the survivals ranging from 0 to 73%.

2. Pesticide detection frequency

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

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 (%)
Chlorpyrifos	82	18	0.01	22	0.04 IC	15	18
Diazinon	46	10	0.01	22	0.105 IA	0	0
Dimethoate	82	20	0.04	24	0.5 IC	9	11
Malathion	82	25	0.02	30	0.035 IC	20	24
Methidathion	82	0	0.05	0	0.66 IC	0	0
Methomyl	18	13	0.05	72	0.7 IC	4	22
Methoxyfenozide	16	11	0.05	69	6.3 IC	0	0
Tebufofenozide	16	0	0.05	0	4.3 IC	0	0
Imidacloprid	58	51	0.05	88	1.05 IC	14	24
Bifenthrin	37	16	0.001	43	0.0013 IC	15	41
λ-cyhalothrin	37	7	0.002	19	0.002 IC	7	19
Cyfluthrin	37	0	0.002	0	0.0074 IC	0	0
Cypermethrin	37	0	0.005	0	0.069 IC	0	0
Fenvalerate/ Esfenvalerate	37	3	0.005	8	0.017 IC	0	0
Permethrin	37	12	0.002	32	0.0014 IC	12	32
Bensulide	58	32	0.04	55	290 IA	0	0
Chlorothalonil	24	1	0.05	4	0.6 IC	0	0
Benfluralin	34	0	0.05	0	1.9 FA	0	0
Ethalfuralin	34	0	0.05	0	0.4 FC	0	0
Oryzalin	34	0	0.05	0	15.4 VA	0	0
Pendimethalin	34	10	0.05	29	5.2 NA	0	0
Prodiamine	34	0	0.05	0	1.5 IC	0	0
Trifluralin	34	6	0.05	18	1.14 FC	0	0
Oxyfluorfen	25	9	0.05	36	0.29 NA	1	4
Azoxystrobin	29	17	0.05	59	44 IC	0	0
Kresoxim-methyl	29	0	0.05	0	55 IC	0	0
Pyraclostrobin	29	9	0.05	31	1.5 NA	0	0
Trifloxystrobin	29	0	0.05	0	2.76 IC	0	0

*FA, fish acute; FC, fish chronic; IA, invertebrate acute; IC, invertebrate chronic; NA, non-vascular acute; VA, vascular acute

3. Laboratory 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	119	0	NA	NA
Matrix Spikes/Duplicates	119	0	NA	NA
Laboratory Control Spikes/Duplicates	0	0	NA	NA
Blind Spikes	24	3	NA	NA
Surrogate Spikes	0	0	NA	NA
Other QC: Describe	NA	NA	NA	NA
Other QC: Describe	NA	NA	NA	NA
Explain out of control QC and interpretation of data:	All lab QCs were within control limits except for three blind spikes. The recoveries of the three blind spikes exceeded the upper control limits (UCL) for azoxystrobin (>34% UCL), diazinon (>7%UCL) and methoxyfenozide (>75% UCL). The associated data had concentrations < 0.5 ppb and none of the concentrations exceeded their lowest aquatic benchmarks. The data were deemed acceptable as their lab blanks and matrix spikes were within the control limits.			

4. Supporting Information

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Appendix I. Study protocol

Appendix II. Sampling site information and maps

Appendix III. Water quality data

Appendix IV. Water or sediment monitoring data

Appendix V. Aquatic toxicity data

Appendix VI. Analytical methods