

AMBIENT MONITORING REPORT

Date: April 22, 2016

1. Study highlights:

- Study Number: 297
- Title: Surface Water Monitoring for Pesticides in Agricultural Areas of California, 2015
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- Study area: County: Monterey, San Luis Obispo, Santa Barbara, Imperial, Riverside
 Waterbody/Watershed: Salinas River, Old Salinas River, Tembladero Slough, 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 of samples to *Hyalella azteca* and *Chironomus dilutus* in 10-day water column testing.

- Sampling period: March, 2015 – October, 2015

- Pesticides monitored:
 Chlorpyrifos, Diazinon, Dimethoate, Malathion, Methidathion, Phorate, Methomyl, Methoxyfenozide, Tebufenozide, Imidacloprid, Bifenthrin, λ -cyhalothrin, Cyfluthrin, Cypermethrin, Fenvalerate/Esfenvalerate, Permethrin, Atrazine and degradates, 2,4 D, Bensulide, Benfluralin, Ethalfluralin, Oryzalin, Pendimethalin, Prodiamine, Trifluralin, Oxyfluorfen, Azoxystrobin, Kresoxim-methyl, Pyraclostrobin, Trifloxystrobin

- Major findings:
 INSECTICIDES. Imidacloprid, methomyl, methoxyfenozide and bifenthrin were the four insecticides with high detection frequencies (DF) (53-81%). Three organophosphates including chlorpyrifos, dimethoate and malathion were detected at 19-21% DF. DFs for pyrethroids varied from 0-53%. Bifenthrin was the most frequently detected pyrethroid (53% DF), followed by λ -cyhalothrin (33% DF), permethrin (27% DF), cypermethrin (10% DF) and fenvalerate/esfenvalerate (7% DF). No detections were reported for diazinon, phorate, methidathion, tebufenozide, cyfluthrin. As for the aquatic life benchmark (BM) exceedances, bifenthrin had the highest frequency (47%) exceeding its lowest BM, followed by λ -cyhalothrin (33%) and permethrin (27%). Chlorpyrifos, malathion, methomyl and imidacloprid had the exceedance frequencies of 12-22%.

HERBICIDES AND FUNGICIDES. The herbicides and fungicides with the highest DF were bensulide (60%) and atrazine (50%), followed by oxyfluorfen (30%), pendimethalin (21%), azoxystrobin (14%), pyraclostrobin (14%), trifluralin (7%), oryzalin (4%) and benfluralin (2%). No detections were reported for the rest of the herbicides and fungicides. Atrazine and oxyfluorfen were the two herbicides that had BM exceedances at 50% and 5%, respectively.

10-day toxicity tests were conducted for water samples collected from 8 locations in Imperial County in October 2015. Two species (*Hyaella azteca* and *Chironomus dilutus*) were used as testing organisms. Six of eight samples caused significant toxicity to *H. azteca* with the survivals ranging from 0 to 54% and 2 samples had significant toxicity to *C. dilutus* with the survivals ranging from 0 to 12.5%.

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	90	17	0.01	19	0.04	IC	11	12
Diazinon	21	0	0.01	0	0.105	IA	0	0
Dimethoate	90	19	0.04	21	0.5	IC	2	2
Malathion	90	17	0.02	19	0.035	IC	15	17
Methidathion	90	0	0.05	0	0.66	IC	0	0
Phorate	22	0	0.05	0	0.21	IC	0	0
Methomyl	50	28	0.05	56	0.7	IC	11	22
Methoxyfenozide	23	17	0.05	74	6.3	IC	0	0
Tebufenozide	23	0	0.05	0	4.3	IC	0	0
Imidacloprid	77	62	0.05	81	1.05	IC	16	21
Bifenthrin	30	16	0.001	53	0.0013	IC	14	47
λ-cyhalothrin	30	10	0.002	33	0.002	IC	10	33
Cyfluthrin	30	0	0.002	0	0.0074	IC	0	0
Cypermethrin	30	3	0.005	10	0.069	IC	0	0
Fenvalerate/ Esfenvalerate	30	2	0.005	7	0.017	IC	2	7
Permethrin	30	8	0.002	27	0.0014	IC	8	27
2,4 D	5	0	0.05	0	13.1	VA	0	0
Atrazine	8	4	0.05	50	0.001	VA	4	50
ACET	8	0	0.05	0	na		-	-
DACT	8	0	0.05	0	na		-	-
DEA	8	0	0.05	0	na		-	-
Bensulide	77	46	0.04	60	290	IA	0	0
Benfluralin	57	1	0.05	2	1.9	FA	0	0
Ethalfuralin	57	0	0.05	0	0.4	FC	0	0
Oryzalin	57	0	0.05	0	15.4	VA	0	0
Pendimethalin	57	12	0.05	21	5.2	NVA	0	0
Prodiamine	57	0	0.05	0	1.5	IC	0	0
Trifluralin	57	4	0.05	7	1.14	FC	0	0
Oxyfluorfen	57	17	0.05	30	0.29	NVA	3	5
Azoxystrobin	14	2	0.05	14	44	IC	0	0
Kresoxim-methyl	14	0	0.05	0	55	IC	0	0
Pyraclostrobin	14	2	0.05	14	1.5	NVA	0	0
Trifloxystrobin	14	0	0.05	0	2.76	IC	0	0

*FA, fish acute; FC, fish chronic; IA, invertebrate acute; IC, invertebrate chronic; NVA, non-vascular acute; VA, vascular acute; na, value not available; dash, not applicable.

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	164	0	NA	NA
Matrix Spikes/Duplicates	164	0	NA	NA
Laboratory Control Spikes/Duplicates	0	0	NA	NA
Blind Spikes	31	0	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:				

4. Supporting Information

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Appendix I. Study 297 protocol

Appendix II. Sampling site information and pictures

Appendix III. Water quality data

Appendix IV. Water monitoring data

Appendix V. Aquatic toxicity data

Appendix VI. Analytical methods