



MEMORANDUM

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SUBJECT: SURFACE WATER MONITORING OF B-CYFLUTHRIN USED IN THE
ASIAN CITRUS PSYLLID TREATMENTS NEAR SURFACE WATER

I. INTRODUCTION

The Asian citrus psyllid (ACP) is an invasive pest that can act as a vector for Huanglongbing (HLB or Citrus Greening), a disease of citrus trees. The California Department of Food and Agriculture (CDFA) Pest Detection/Emergency Projects (PDEP) Branch detected ACP in San Diego and Imperial Counties in August 2008 and started treatments in August 2009.

HLB is a bacterial disease of citrus spread by ACP. The disease produces bitter fruit and eventual tree death; infected plants may not show symptoms for years. There is no known treatment for the disease except tree removal. In North America HLB was found in Florida (in 2005) and is now in Louisiana, Georgia, South Carolina, Texas, Hawaii, California and Mexico¹. https://cizr.ucr.edu/citrus_greening.html.

The CDFA oversees voluntary residential treatments of ACP host plants around commercial citrus groves and mandatory residential treatments around HLB detected sites. All host plants on each property were treated with Merit® 2F, active ingredient (a.i.) imidacloprid, and Tempo® SC Ultra, a.i. β-cyfluthrin. All applications were performed and/or supervised by CDFA staff.

The CDFA has a National Pollutant Discharge Elimination System (NPDES) permit, issued by the California State Water Resources Control Board, for pesticide applications around water bodies. In accordance with the NPDES permit, CDFA has implemented best management practices (BMP) as mitigation when treating within 30 feet of sensitive areas/waterbodies. These BMPs include modified spray techniques and/or physical barriers, and water monitoring. On the request of the PDEP Branch, Environmental Monitoring Branch (EMB) staff of the California Department of Pesticide Regulation (DPR) conducted surface water monitoring of several ACP treatments.

1. Center for Invasive Species Research “Huanglongbing (HLB or Citrus Greening)”, https://cizr.ucr.edu/citrus_greening.html. Accessed November 2019.

Description of Treatment

Treatment consisted of a soil drench of Merit® 2F, diluted with water to 0.027% a.i., two gallons per inch of trunk growth with a maximum of 7 gallons per tree. The pesticide was delivered around the base of the tree with a high flow, low pressure lawn gun. Foliar applications of Tempo® SC Ultra, diluted with water to 0.0020% a.i., were delivered to foliage with a JD-9 type high pressure tree gun.

II. MATERIALS AND METHODS

Surface water grab samples were collected using 1 liter amber glass bottles with Teflon lined caps. At sites with insufficient water depth, a 32-oz wide mouth mason jar was used to collect the sample before transferring it into the 1 liter amber glass bottle. In situ measurements were taken with a YSI (Yellow Springs Instrument) model 85 - water temperature, conductivity and dissolved oxygen - or with an Oakton Multi-Parameter PCSTester 35 - water pH, temperature, conductivity. Dissolved oxygen was not measured at some sites due to insufficient water depth. All samples were stored on wet ice or refrigerated until delivered to the Department of Fish and Game Water Pollution Control Laboratory (CDFG-WPCL) or the CDFA Center for Analytical Chemistry (CDFA-CAC) for residue analysis.

Post treatment stream/canal samples were collected 20 to 50 meters downstream of the treatment site, within 5 minutes of the end of treatment. The post treatment lake sample was collected ~1 hour after treatment ~20 meters from the nearest treatment site. All background samples were collected before the start of treatment either at the treatment site or upstream of the treatment site (Table 1).

III. RESULTS

Samples were collected from the 14 treatments at 10 different sites between March 2012 and May 2018. None of the post treatment samples had higher concentrations of β -cyfluthrin than the corresponding background samples. The City of Industry and Ojai sites had quantifiable levels of β -cyfluthrin at 0.005 and 0.207 $\mu\text{g/L}$ after treatment and 0.007 and 0.269 $\mu\text{g/L}$ before treatment, respectively (Table 2). The San Gabriel site had trace detections, below quantifiable amount, of β -cyfluthrin in the background and post application samples. All other treatment sites had no detectable β -cyfluthrin residues.

IV. CONCLUSION

β -cyfluthrin monitoring of 14 ACP treatments near waterbodies in Los Angeles, Riverside, and Ventura Counties yielded the following results.

- 23 of the 26 sample periods contained no quantifiable levels of β -cyfluthrin.
- No post treatment samples contained higher detectable levels of β -cyfluthrin than their corresponding background samples.

Table 1. Sample collection sites.

Sample Site	# Host Trees within 30 Feet of Water Body	Description
Canyon Lake	1	Reservoir, Riverside Co., sample collected from boat dock ~20 meters from treated host tree.
San Jose Creek City of Industry	1	Concrete flood control channel, Los Angeles Co.
McDonald Canyon, Ojai	2	Unnamed creek, McDonald Canyon, Ventura Co.
Hemet Main Canal East	2	Irrigation canal, Riverside Co.
Hemet Main Canal West	18	Irrigation canal, Riverside Co.
Alhambra Wash San Gabriel	1	Concrete flood control channel, Los Angeles Co.
Alhambra Wash Rosemead - 1	1	Concrete flood control channel, Los Angeles Co., Rosemead 1 is upstream of Rosemead 2 & 3, the background samples from this site were used for Rosemead 2 & 3
Alhambra Wash Rosemead - 2	1	
Alhambra Wash Rosemead - 3	1	
Alhambra Wash Rosemead - 4	2	Concrete flood control channel, Los Angeles Co., Rosemead 4 is upstream of Rosemead 1, 2 & 3.

Table 2. Results of water sampling for cyfluthrin in surface water.

Sample Site	Treatment*	Wind Speed & Direction	Water Temperature (°C)	Water pH	Water Conductivity (ms/cm)	Dissolved Oxygen	β-cyfluthrin (ug/L)	Reporting Limit (ug/L)	Date Sample Collected	Lab
Canyon Lake	Bak	5 mph NW	14.7	8.25	.968	12 mg/L	ND	0.005	3/13/2012	WPCL
Canyon Lake	Post	5 mph NW	15.9	8.76	.953	12 mg/L	ND	0.005	3/14/2012	WPCL
San Jose Creek	Bak	5 mph SW	26.15	9.8	1.14	16.3 mg/L	0.007	0.005	4/10/2012	WPCL
San Jose Creek	Post	5 mph SW	26.48	9.9	1.17	16.7 mg/L	0.005	0.005	4/10/2012	WPCL
McDonald Canyon, Ojai	Bak	Calm	11	7.5	1.38	NM**	0.269	0.005	1/14/2014	WPCL
McDonald Canyon, Ojai	Post	Calm	12	7.5	1.40	NM**	0.207	0.005	1/14/2014	WPCL
Hemet Main Canal East	Bak	Calm	19	8.2	.464	121.00%	ND	0.005	4/23/2014	WPCL
Hemet Main Canal East	Post	Calm	19.2	8.3	.455	122.00%	ND	0.005	4/23/2014	WPCL
Hemet Main Canal West	Bak	Calm	18.5	8	.429	110.00%	ND	0.005	4/23/2014	WPCL
Hemet Main Canal West	Post	Calm	18.7	8.2	.445	113.00%	ND	0.005	4/23/2014	WPCL
Hemet Main Canal East	Bak	Calm	16.1	6.5	.656	87.70%	ND	0.005	2/19/2015	WPCL
Hemet Main Canal East	Post	Calm	16.1	6.5	.656	87.70%	ND	0.005	2/19/2015	WPCL
Hemet Main Canal West	Bak	Calm	16.9	6.7	.661	88.30%	ND	0.005	2/19/2015	WPCL
Hemet Main Canal West	Post	Calm	16.9	6.7	.661	88.30%	ND	0.005	2/19/2015	WPCL
Alhambra Wash - San Gabriel	Bak	Calm	34.5	10.15	2.30	102%	Trace	0.005	8/5/2015	WPCL
Alhambra Wash - San Gabriel	Post	Calm	37	9.75	1.32	107%	Trace	0.005	8/5/2015	WPCL
Hemet Main Canal East	Bak	<2 S	15.7	6.9	.500	104.60%	ND	0.005	11/20/2015	WPCL
Hemet Main Canal East	Post	<2 S	16.5	7	.494	106.10%	ND	0.005	11/20/2015	WPCL
Hemet Main Canal West	Bak	Calm	17.5	7	.486	99.40%	ND	0.005	11/20/2015	WPCL
Hemet Main Canal West	Post	Calm	18.4	7	.495	100.50%	ND	0.005	11/20/2015	WPCL
Alhambra Wash - Rosemead 1	Bak	Calm	17	8.5	1.35	NM**	ND	0.05	5/5/2018	CAC
Alhambra Wash - Rosemead 1	Bak	Calm	17	8.5	1.35	NM**	ND	0.05	5/5/2018	CAC
Alhambra Wash - Rosemead 1	Post	Calm	17.3	8.7	1.39	NM**	ND	0.05	5/5/2018	CAC
Alhambra Wash - Rosemead 2	Post	Calm	19	8.9	1.35	NM**	ND	0.05	5/5/2018	CAC
Alhambra Wash - Rosemead 3	Post	Calm	20.4	9	1.24	NM**	ND	0.05	5/5/2018	CAC
Alhambra Wash - Rosemead 4	Bak	Calm	24	9.1	1.08	NM**	ND	0.05	5/5/2018	CAC
Alhambra Wash - Rosemead 4	Post	Calm	25.6	9	1.13	NM**	ND	0.05	5/5/2018	CAC

* Bak = Before treatment.

* Post = After treatment.

** NM = Not measured, insufficient water level for in situ measurement.