



Julie Henderson  
Director

MEMORANDUM

Yana Garcia  
Secretary for  
Environmental Protection

TO: Joy Dias  
Environmental Program Manager I  
Environmental Monitoring Branch

*Original signed by 2/22/24*

FROM: Vaneet Aggarwal  
Senior Environmental Scientist  
916-445-3870

*Original signed by 2/22/24*

DATE: February 21, 2024

SUBJECT: SUMMARY OF JAPANESE BEETLE ERADICATION PROGRAM  
MONITORING FOR CHLORANTRANILIPROLE IN SACRAMENTO  
COUNTY, 2021-2023

**INTRODUCTION**

The Japanese beetle is an invasive pest first found in the United States in 1916 near Riverton, New Jersey. It has spread throughout most of the states east of the Mississippi River, with only partial infestations west of the Mississippi River where most infestations are eradicated. Japanese beetle grubs feed on grass roots and cause damage to lawns and pastures. Adult Japanese beetles feed on foliage, fruit, and flowers of more than 300 plants, causing significant damage to residential and urban environments, as well as agriculture. Between June 4 and July 20, 2020, the California Department of Food and Agriculture (CDFA) trapped a total of 231 Japanese beetles, *Popillia japonica* Newman, in the communities of Arden-Arcade and Rancho Cordova (CDFA-PEP 2022). These detections resulted in the initiation of an eradication program in these communities.

This eradication program consisted of one treatment of Acelepryn<sup>®</sup>, chlorantraniliprole active ingredient (a.i.), to turf in the treatment areas. At the request of CDFA, the Environmental Monitoring Branch of the Department of Pesticide Regulation (DPR) supervised the pesticide treatments with CDFA and randomly collected samples from the treatment areas. These samples were analyzed for pesticide residues to provide information about the concentrations of chlorantraniliprole in the air, turf, soil, and tank mixtures.

This document summarizes the chlorantraniliprole monitoring results for the Japanese beetle eradication program treatments in Sacramento County from 2021–2023. Air, turf, soil, and tank mixture samples were collected and analyzed for pesticide residues.

## **Description of Application**

During this monitoring program (2021–2023), treatment for Japanese beetle in Sacramento County consisted of Acelepryn<sup>®</sup> application to soil under host plants and/or turf using either spray applications or a hand spreader/drop spreader. Treatments of monitored properties occurred in April–May of each year.

The pesticide product Acelepryn<sup>®</sup> (EPA Reg. #100-1489), which contains 18.4% of the a.i. chlorantraniliprole, was used for the Japanese beetle eradication spray application treatments. The Acelepryn<sup>®</sup> was mixed with water (18.4 fl. oz. per 100 gallons of water) in a 200-gallon skid mounted spray rig. The mixed product was delivered through a chemical applicator spray gun (chemlawn gun, 3 gpm nozzle) attached to a hose connected to the application tank. The product was applied at a maximum application rate of 3 gallons per 1,000 ft<sup>2</sup> and water was applied after the pesticide application.

Acelepryn<sup>®</sup> G (EPA Reg. #100-1500), which contains 0.2% of the a.i. chlorantraniliprole, was applied with a hand spreader/drop spreader for Japanese beetle eradication treatments at a rate of 2.3 lb/1,000 ft<sup>2</sup> and water was applied after the pesticide application.

## **Sampling Sites**

Treatment sites were established in the Arden and Rancho Cordova areas of Sacramento County. Monitoring site selection was based on the following criteria: sites must be (1) located in the treatment area; (2) accessible the day before, during, and after the application; and (3) located in a secure area where any disturbance of the air sampling equipment would be unlikely. Residents authorized DPR and CDFA staff access to the area.

## **MATERIALS AND METHODS**

The materials and methods used to monitor for chlorantraniliprole residues during implementation of the Japanese beetle eradication program of 2021–2023 are described in detail below. Air, turf, and soil were sampled at various pesticide application intervals: background (pre-treatment), treatment, and/or post-treatment. The pesticide application tank was also sampled to establish treatment concentrations of chlorantraniliprole.

All samples were analyzed by CDFA's Center for Analytical Chemistry laboratory. The samples were kept frozen at the laboratory until they could be extracted and analyzed. The tank mixtures were refrigerated and analyzed within 2 weeks.

---

<sup>1</sup> The mention of commercial products, their source, or use in connection with this eradication project is not to be construed as an actual or implied endorsement of such products.

## **Air Sampling**

A personal air sample pump (SKC# 224-PCXR) calibrated from 2.5 to 3 liters per minute mounted with a XAD-2 resin tube trapping medium was used at each site. Air samples were collected at the following intervals; sample intervals were run consecutively and did not overlap.

- **Background (Pre-treatment):** These samples were collected just prior to the pesticide application; the air sampler was run for a duration of about 20 hours.
- **Treatment:** The air sampler was run for a duration of about 8 hours as the pesticide was being applied in the area.
- **Post-treatment:** The air sampler was run for a duration of 18–22 hours after the pesticide application was completed.

All air samples were frozen on dry ice or in a freezer until they were delivered to the laboratory for analysis.

## **Turf Dislodgeable Residue**

Turf dislodgeable residue samples were collected using the MCR (Modified California Roller) method. A weighted cylinder was rolled back and forth five times over a cotton fabric held in place on the turf surface, transferring the chemical residues to the fabric. This method was used and described in a turf transferable residues (TTR) study conducted following imidacloprid application by DPR (Welsh, *et al.*, 2005). Fabric samples were frozen on dry ice or in a freezer until they were delivered to the laboratory.

## **Turf/Soil Sampling**

Each turf/soil sample consisted of three randomly selected cores taken to a depth of 1 inch. All cores contained turf and a substantial amount of soil. Cores were collected using a 2-1/2-inch (28.56 square centimeter [cm<sup>2</sup>]) diameter stainless steel tube and composited into one wide mouth Mason<sup>®</sup> jar with an aluminum foil lined lid. Background samples were collected before treatment. Treatment samples were collected after the pesticide application when the turf was dry. Post-treatment (four-weeks after treatment) samples were also collected at some sites. Samples were frozen on dry ice or in a freezer until delivered to the laboratory.

### **Tank Mixture Sampling/Product Concentration**

Tank mixture samples were collected from treatment spray guns at the time of treatment to establish chlorantraniliprole pesticide concentrations in the spray material (Pitts, 2020). Samples consisted of half-filled 500 milliliter Nalgene® wide mouth bottles. The exterior of each bottle was rinsed to remove spilled product; bottles were then triple bagged and refrigerated (on wet or blue ice) until delivered to the laboratory. Tank sample results were compared to the amount/application rate specified on the product label to ensure the pesticide was mixed properly.

### **Quality Control**

The CDFA Center for Analytical Chemistry analyzed all samples collected for this monitoring study. Standard operating procedures for continuing quality control (QC) measures are specified in Peoples, 2019. Continuing QC samples were evaluated by laboratory chemists and adjustments were made to the analytical equipment on an as-needed basis to ensure analytical integrity.

## **RESULTS AND DISCUSSION**

### **Air**

No chlorantraniliprole residues were detected in any of the air samples collected. The highest detection limit of  $0.904 \mu\text{g}/\text{m}^3$  occurred during the treatment period. The detection limits for the pre-treatment and post-treatment sample periods were below  $0.4 \mu\text{g}/\text{m}^3$ . Detection limits for all samples are in Table 1.

### **Turf Dislodgeable Residue (MCR)**

Turf dislodgeable residue samples were collected using MCR over a  $5690 \text{ cm}^2$  sample area. No chlorantraniliprole residues were detected in any of the background samples. The sample mean for the post-treatment samples was  $14.6 \mu\text{g}/\text{sample}$  with a maximum of  $86.5 \mu\text{g}/\text{sample}$ . All MCR sample results are in Table 2.

### **Turf/Soil Samples**

No chlorantraniliprole residues were detected in any of the background samples. The sample mean of the 24 turf/soil plugs for the treatment samples was  $0.61 \text{ ppm}$  total residues of chlorantraniliprole with a range of  $0.0134$  to  $2.75 \text{ ppm}$  (Table 3). For eight post-treatment (four-weeks after treatment) samples, the sample mean was  $0.27 \text{ ppm}$  total residues of chlorantraniliprole with a range of  $0.13$  to  $0.402 \text{ ppm}$  (Table 3).

### **Tank Mix**

Each site was treated from a separate tank mixture. The mean concentration for all samples was 0.02411% chlorantraniliprole (Table 4), compared to the target concentration of 0.02345%. Tank rinse samples were also collected before mixing the product, and chlorantraniliprole was not detected in any of the tank rinse samples.

### **CONCLUSION**

DPR collected air, turf, soil, and tank mixture samples and CDFA's Center for Analytical Chemistry analyzed the samples to determine the residues of chlorantraniliprole resulting from CDFA's Japanese beetle eradication program treatment. Samples collected from the Japanese beetle treatment areas yielded the following results.

- No chlorantraniliprole residues were detected in any of the air samples collected. Detection limits were below  $0.4 \mu\text{g}/\text{m}^3$  before and after treatment, and below  $0.904 \mu\text{g}/\text{m}^3$  during the treatment period.
- The MCR turf dislodgeable samples collected post-treatment had a mean concentration of  $14.6 \mu\text{g}/\text{sample}$ , or  $0.0026 \mu\text{g}/\text{cm}^2$ . The maximum concentration was  $86.5 \mu\text{g}/\text{sample}$ , or  $0.015 \mu\text{g}/\text{cm}^2$ . No chlorantraniliprole residues were detected in any of the background MCR turf dislodgeable samples collected.
- The turf/soil plug samples collected post-treatment had a mean concentration of 0.61 ppm while the maximum detected concentration was 2.75 ppm. For samples collected four-weeks after treatment, the mean concentration was 0.27 ppm, and the maximum detected concentration was 0.402 ppm. No chlorantraniliprole residues were detected in any of the background turf/soil plug samples collected.
- The tank mixture sample mean concentration for all years sampled was 0.02411%, this was within 3% of the target concentration.

## REFERENCES

- Peoples, S. 2019. SOP QAQC001.01. Chemistry Laboratory Quality Control. Available at: <https://www.cdpr.ca.gov/docs/emon/pubs/sops/qaqc00101.pdf> (verified February 14, 2024). California Department of Pesticide Regulation, Sacramento, California.
- Pitts, R. 2020. SOP FSOT007.01. Procedure for Sampling Pesticide Application Equipment. Available at: <https://www.cdpr.ca.gov/docs/emon/pubs/sops/fsot00701.pdf> (verified February 14, 2024). California Department of Pesticide Regulation, Sacramento, California.
- Welsh A, Powell S, Spencer J, Schneider F, Hernandez B, Beauvais S, Fredrickson AS, Edmiston S, 2005. Transferable Turf Residue Following Imidacloprid Application. HS-1860. Worker Health and Safety Branch, Cal/EPA Department of Pesticide Regulation.

**TABLES**

**Table 1. Air Sampling Results.** Detection limits are in  $\mu\text{g}/\text{m}^3$ .

Interval	Site	Amount Detected ( $\mu\text{g}/\text{m}^3$ )	Detection Limit ( $\mu\text{g}/\text{m}^3$ )	Detection Limit ( $\mu\text{g}/\text{sample}$ )
<b>Background (Pre-treatment)</b>	DWRC	ND	0.349	1.0
	RAS	ND	0.391	1.0
<b>Treatment</b>	CVES 1	ND	0.575	1.0
	CVES 2	ND	0.633	1.0
	DWRC	ND	0.634	1.0
	RAS	ND	0.666	1.0
	WRCPRC 1	ND	0.904	1.0
	WRCPRC 2	ND	0.884	1.0
<b>Post-Treatment</b>	DWRC	ND	0.326	1.0
	RAS	ND	0.273	1.0

**Table 2. Turf Dislodgeable Residue (MCR) Results.** Results are reported in µg per sample. The sample area was 5690 cm<sup>2</sup>. Pass “1” is rolling in one direction, the return is Pass “2”.

Interval	Site	Amount Detected (µg/sample)	# of Passes	Detection Limit (µg/sample)
<b>Background (Pre-treatment)</b>	AWRC*	ND	10	1.0
	CVES 1	ND	10	1.0
	CVES 2	ND	10	1.0
	CVES 3	ND	10	1.0
	DWRC	ND	10	1.0
	OLS*	ND	10	1.0
	RAS	ND	10	1.0
	SWRC*	ND	10	1.0
	WRCPRC 1	ND	10	1.0
	WRCPRC 2	ND	10	1.0
<b>Post-Application</b> Mean 14.6 SD 19.8	AWRC 1*	3.04	10	1.0
	AWRC 2*	4.77	10	1.0
	CVES 1	3.84	10	1.0
	CVES 2	3.44	10	1.0
	CVES 3	3.50	10	1.0
	CVES 4	25.0	10	1.0
	CVES 5	48.2	10	1.0
	CVES 6	86.5	10	1.0
	DWRC 1	1.37	10	1.0
	DWRC 2	ND	10	1.0
	OLS 1*	3.06	10	1.0
	OLS 2*	15.0	10	1.0
	OLS 3*	1.74	10	1.0
	OLS 4*	ND	10	1.0
	RAS 1	17.9	10	1.0
	RAS 2	22.7	10	1.0
	SWRC 1*	3.66	10	1.0
	SWRC 2*	2.54	10	1.0
	WRCPRC 1	ND	10	1.0
	WRCPRC 2	ND	10	1.0
WRCPRC 3	ND	10	1.0	
WRCPRC 4	ND	10	1.0	
WRCPRC 5	ND	10	1.0	
WRCPRC 6	1.36	10	1.0	

\* Granular Acelepryn® was applied.

**Table 3. Soil/turf Cores.** Total residue results are reported in parts per million (ppm).

Interval	Site	Amount Detected (ppm)	Detection Limit (ppm)
<b>Background (Pre-treatment)</b>	AWRC*	ND	0.01
	CVES 1	ND	0.01
	CVES 2	ND	0.01
	CVES 3	ND	0.01
	DWRC	ND	0.01
	OLS*	ND	0.01
	RAS	ND	0.01
	SWRC*	ND	0.01
	WRCPRC 1	ND	0.01
	WRCPRC 2	ND	0.01
<b>Treatment</b> Mean 0.61 SD 0.68	AWRC 1*	0.0470	0.01
	AWRC 2*	0.168	0.01
	CVES 4	0.430	0.01
	CVES 5	0.403	0.01
	CVES 6	0.697	0.01
	CVES 7	0.456	0.01
	CVES 8	0.412	0.01
	CVES 9	0.388	0.01
	DWRC 1	1.87	0.01
	DWRC 2	2.75	0.01
	OLS 1*	0.308	0.01
	OLS 2*	0.495	0.01
	OLS 3*	0.734	0.01
	OLS 4*	0.413	0.01
	RAS 1	0.703	0.01
	RAS 2	2.13	0.01
	SWRC 1*	0.758	0.01
	SWRC 2*	0.313	0.01
	WRCPRC 3	0.0134	0.01
	WRCPRC 4	0.193	0.01
WRCPRC 5	0.290	0.01	
WRCPRC 6	0.185	0.01	
WRCPRC 7	0.278	0.01	
WRCPRC 8	0.296	0.01	

**Table 3 con't. Soil/turf Cores.** Total residue results are reported in parts per million (ppm).

Interval	Site	Amount Detected (ppm)	Detection Limit (ppm)
<b>Post-Treatment (4-week)</b> Mean 0.27 SD 0.10	CVES 10	0.377	0.01
	CVES 11	0.222	0.01
	CVES 12	0.252	0.01
	CVES 13	0.295	0.01
	WRCPRC 9	0.329	0.01
	WRCPRC 10	0.171	0.01
	WRCPRC 11	0.130	0.01
	WRCPRC 12	0.402	0.01

\* Granular Acelepryn® was applied.

**Table 4. Tank Mixture Samples.** Total residue results reported in percent. The target mix concentration was 0.02345%.

Interval	Site	Amount Detected (%)	Detection Limit (mg/mL)
<b>2021 Samples</b>	CVES 1	0.061	0.01
	CVES 2	0.0229	0.01
	CVES 3	0.0244	0.01
	DWRC	0.0242	0.01
	RAS	0.0246	0.01
<b>2022 Samples</b>	CLS	0.0215	0.01
	MSS 1	0.0267	0.01
	MSS 2	0.0232	0.01
	WAS 1	0.0265	0.01
	WAS 2	0.0256	0.01
<b>2023 Samples</b>	MSS 3	0.0208	0.01
	NRS 1	0.0164	0.01
	NRS 2	0.0208	0.01
	TCRC	0.0149	0.01
	WAS 2	0.0205	0.01
	WWRC 1	0.0156	0.01
	WWRC 2	0.0203	0.01