

Sediment Ponds as a Management Practice in Almonds



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Cooperative Study

California Department of
Pesticide Regulation

Coalition for Urban/Rural
Environmental Stewardship

Labwork by:

California Dept. Fish and
Game-- Water Pollution
Control Laboratory

Study Objectives

- Quantify whole water runoff concentrations of a chlorpyrifos hull split spray
- Determine the effectiveness of a sediment pond in reducing concentrations and total loading of chlorpyrifos in irrigation tailwater



Study Site

- 40 acre almond orchard
- San Joaquin Valley near Chowchilla
- Flood irrigated



Application

- Airblast tank mix at hull split
- Lambda Cyhalothrin 0.04 lb ai/A
- Chlorpyrifos 2 lb ai/A



Irrigation

- Flood irrigated in sets
- 60 hours to irrigate block
- Runoff collected in interception ditch
- Ditch flows to adjacent sediment pond



Pond

- 19 by 160 ft
- Holds approx 160,000 gal
- Recirculation pump
- Pump on when pond depth $>$ 2ft.
- Retention time = several hours
- Water re-circulates to top of field



Sampling Regime

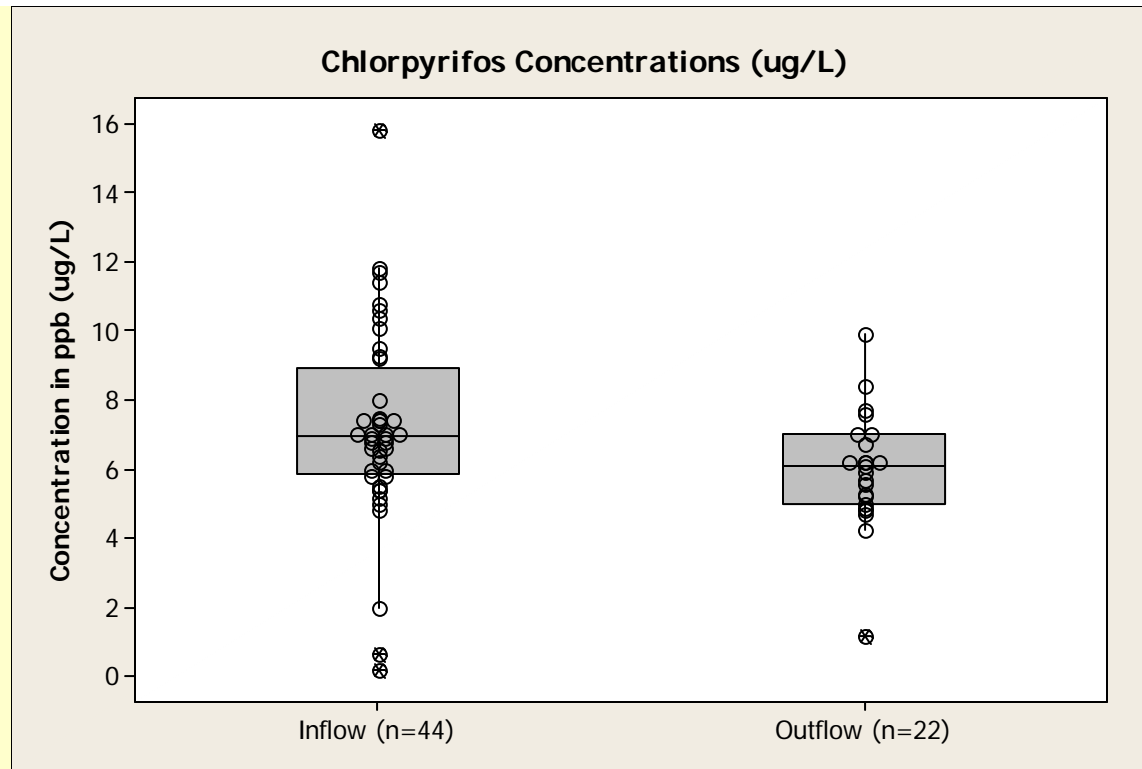
- Chlorpyrifos
 - Inflow- Hourly for 48 hours
 - Outflow- Every 2 hours for 48 hours



Flow Measurements

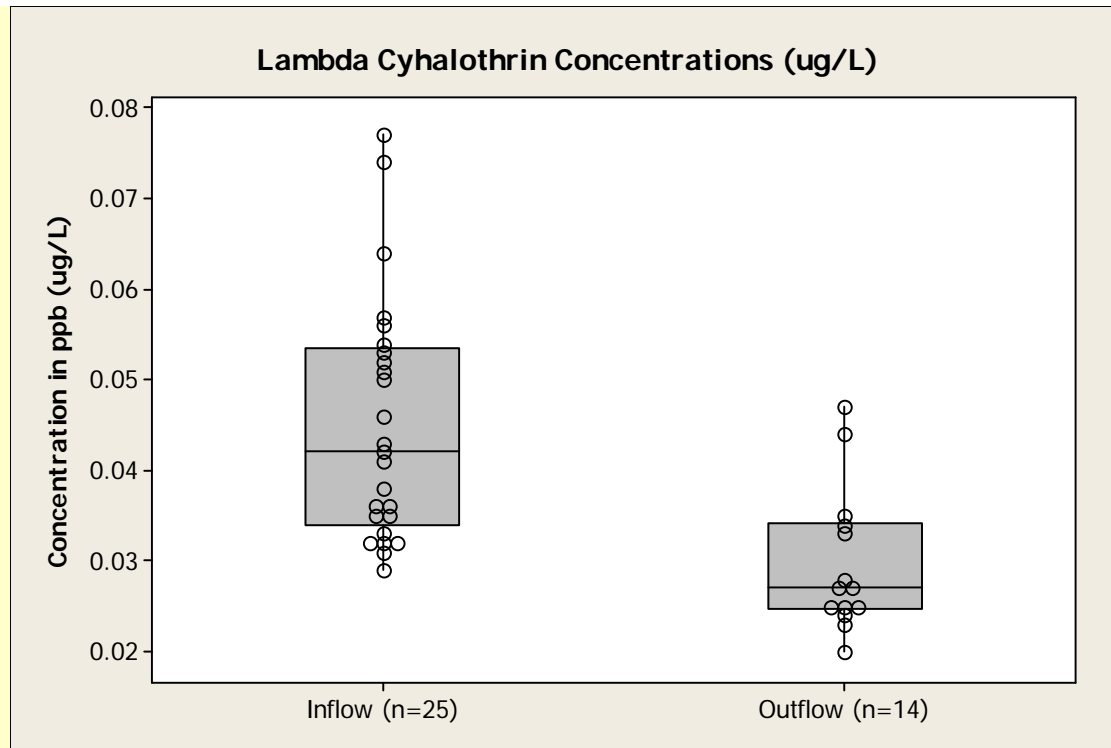
- Doppler flow meter
- Inflow 0 to 341 gal/min
- Outflow pumped at constant 175 gal/min
- Approx 580,000 gallons total into pond





Results

- Whole-water samples, unfiltered
- Inflow concentrations 0.70 to 15.8 ug/L
- Outflow concentrations 1.15 to 9.9 ug/L
- Approx 33 % reduction in total mass



Results

- Whole-water samples, unfiltered
- Inflow concentrations 0.029 to 0.077 ug/L
- Outflow concentrations 0.020 to 0.047 ug/L
- Approx 46 % reduction in total mass

Conclusions

- Sediment pond did reduce total chlorpyrifos loads, but not by enough.

- * Mean outflow conc. = 6 $\mu\text{g/L}$

- * 0.020 $\mu\text{g/L}$ (acute) 1-hour average

- * 0.014 $\mu\text{g/L}$ (chronic) 4-day average

- Retention time not enough for a relatively water soluble compound
- However, sediment ponds do have a place as a management practice for pesticides
 - Enzyme products- such as Landguard TM
 - Recirculation
 - Surface water regulations require hold times

Proposed Surface Water Regulations in California

- Current dormant spray regs require water hold time of 72 hours for storm runoff
- New regulations -- as currently proposed-- require hold time of 72 hours for BOTH stormwater and irrigation tailwater
- Exemption for growers with an approved “management plan”
- Exemption for treatment with enzyme or similar product

Thanks

- Anonymous grower and his irrigator
- Dow AgroSciences for donation of Lorsban
- DPR field crew



DPR's Surface Water Protection Program

<http://www.cdpr.ca.gov/docs/emon/ehap.htm>

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