

Vegetated Ditches as a Management Practice in Irrigated Alfalfa

Results for Study 235 : PIN 017



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Cooperative Study

- Funded by PRISM Grant

- San Joaquin River
Chlorpyrifos TMDL

- In cooperation with
CURES and San Luis/Delta
Mendota Water Authority

Study Objective

- Evaluate the effects of two management practices on chlorpyrifos concentrations in irrigation runoff from alfalfa

- Conventional ditch

- Vegetated ditch



Vegetated Ditch

- 5 species perennial grasses
- Mowed prior to irrigation season



Study Site

- 75 Acre alfalfa field
- Crow's Landing
- Drains to Orestimba Creek

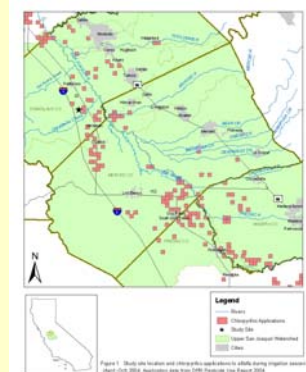


Figure 1. Study site location and chlorpyrifos applications to alfalfa during irrigation season April-Oct 2004. Application data from CDPR Pesticide Use Report 2004.

Study Site

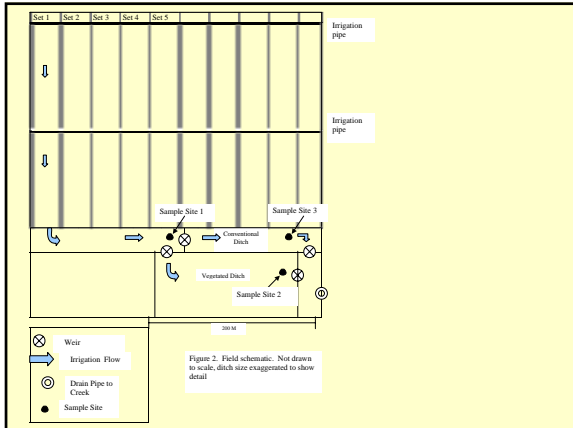
- Chlorpyrifos applied several times during irrigation season
- Weevils
- Worms, Aphids



Photos from UCCE Pest Management Guidelines

Study Site

- Flood irrigated, 2 sets gated pipe
- Irrigation sets rotated every 12 hours
- 5 days to irrigate whole field
- Rate-- 4 to 6 inches or 24 to 40 Acre/Feet
- Approx. 7 irrigation events per season



Sampling Sites

- Site 1 Inflow
- Site 2 Veg Ditch
- Site 3 Conv. Ditch



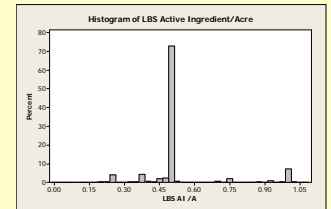
Application

- Mid July
- 100 foot unsprayed buffer to prevent overspray
- Some drift into ditches <1% of application rate



Application

- Rate 1 pint/acre
- Label 0.5-2 pint/acre
- 14 day pre-harvest interval



2005 PUR data

Runoff

- Irrigation began 48 hours after application
- Runoff occurred 8 hours after irrigation start
- Sampled 5 irrigation sets



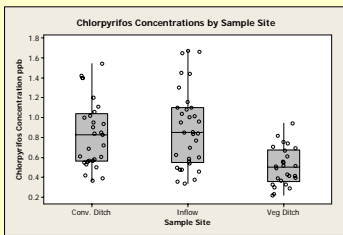
Runoff

- Grab samples into 1 L ambers
- Six samples/site/event



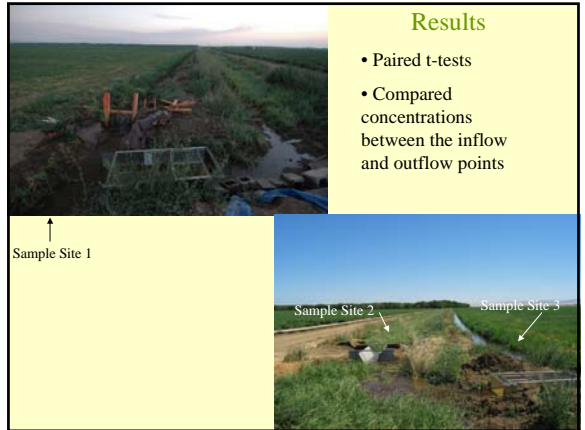
Results

- 0.22 $\mu\text{g/L}$ to 1.67 $\mu\text{g/L}$



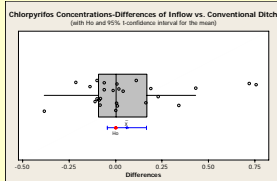
Results

- Paired t-tests
- Compared concentrations between the inflow and outflow points

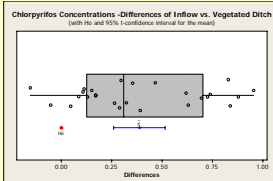


Results

- Conventional ditch not different than inflow
- Vegetated ditch was sig. different than inflow
- Median 38% reduction in vegetated ditch



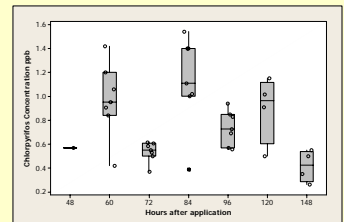
Conv. Ditch



Veg Ditch

Irrigation Lag Results

- Samples collected at 48 to 144 hours after application
- No consistent difference between irrigation events
- Delaying irrigation by six days had no effect



Summary

- There were detectable levels of chlorpyrifos in the irrigation return water
- There was a significant difference in concentration between inflow and outflow of vegetated ditch
- Median reduction of 38%
- Delaying irrigation by six days had no effect



Study Weaknesses

- Ditch design not practical
 - Carrying capacity
 - Only used half
- Lacking volume/load data
- Water use at site not representative?



Next Steps

- Repeat study with pyrethroid
- Lambda cyhalothrin?



Special Thanks

- Anonymous grower
- Patrick Romero, PCA
- Patterson Flying Service

