

SCCWRP #0705

Pyrethroids in southern California coastal sediments

Wenjia Lao, Liesl Tiefenthaler, Darrin J. Greenstein, Keith A. Maruya, Steven M. Bay, Kerry Ritter and Kenneth Schiff

ABSTRACT

Little is known about pyrethroid fate and effects in estuarine and marine environments. In the present study, the extent and magnitude of pyrethroids in coastal embayments of the Southern California Bight (SCB), USA, were assessed. Using a stratified probabilistic design, 155 sediment samples were collected from four embayment habitats (estuaries, marinas, open bays, and ports) and analyzed for eight common-use pyrethroids. Total pyrethroid concentrations ranged from less than 0.5 to 230 $\mu\text{g}/\text{kg}$ dry weight (area-weighted mean concentration = $5.1 \pm 3.1 \mu\text{g}/\text{kg}$) and were detected in 35% of the total SCB embayment area. Estuaries and marinas had the greatest areal extent of detectable concentrations (up to 65%) and the greatest area-weighted mean concentrations ($22.1 \pm 26.5 \mu\text{g}/\text{kg}$). Sites with the greatest pyrethroid concentrations were located near sources of runoff from urban watersheds. Bifenthrin and cyfluthrin were detected in 32 and 15% of all samples, respectively, whereas the other six pyrethroids were detected in $\leq 5\%$ of samples. Permethrin and bifenthrin had the highest concentrations at 132 and 65 $\mu\text{g}/\text{kg}$. Toxic units estimated for the marine amphipod *Eohaustorius estuarius* ranged from 0 to 5.8, exceeding unity in 9 and 32% of the total and estuary habitat areas, respectively, and were not correlated with mortality, suggesting that other factors (e.g., co-occurring contaminants, reduced bioavailability) may affect the predictive capability using a single test species.

Due to distribution restrictions, the full-text version of this article is available by request only.

Please contact pubrequest@sccwrp.org to request a copy.