

SCCWRP Annual Report 2009

Analysis, occurrence, and toxic potential of pyrethroids and fipronil in sediments from the Ballona Creek estuary

Wenjian Lao, David Tsukada, Darrin J. Greenstein, Steven M. Bay and Keith A. Maruya

ABSTRACT

Eight pyrethroids and fipronil and its three major degradates were analyzed in urban estuarine sediments that exhibited a range of toxic effects to an amphipod test species. Sediments from Ballona Creek, an urban estuary in southern California, collected during three dry season events were analyzed by gas chromatography with electron capture and negative chemical ionization mass spectrometric detection (GC-ECD and GC-NCI-MS). The two detection methods were in agreement for intermediate levels of pyrethroid contamination (10 - 50 ng/g dry wt), but deviated for both low and high concentrations (<5 and >50 ng/g). Sediments contained total pyrethroids as high as 473 ng/g with permethrin, bifenthrin and cypermethrin as the most abundant compounds. In contrast, fipronil and its desulfinyl, sulfide and sulfone degradates were detected at lower levels (≤ 0.18 to 16 ng/g). Toxic units estimated for these compounds revealed that bifenthrin and cypermethrin were likely contributors to the mortality observed in tests with the estuarine amphipod *Eohaustorius estuarius*. Although fipronil was not a likely contributor to the observed mortality, the concentrations detected may be of concern for more sensitive crustacean species. Furthermore, the spatial pattern of pyrethroid contamination and potential toxicity was highly correlated with finegrained substrate, which shifted to downstream stations within a three month period during the 2008 dry season.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2009AnnualReport/AR09_277_289.pdf