

## DDT AND PCB IN BENTHIC CRABS

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In recent years, relatively large concentrations of DDT compounds have been found in a variety of organisms collected off Los Angeles and Orange Counties. An important part of our research efforts has been to describe the input rates and coastal distributions of these and other synthetic organics so as to better understand their behavior in the marine environment. These studies have underscored the importance of the sediments and bottom organisms in the distribution of chlorinated hydrocarbons contaminants.

One benthic species of considerable ecological and economic importance is the market crab *Cancer anthonyi*. This scavenger feeds on bottom material, which can be significantly contaminated with trace constituents. Therefore, we have studied the concentration of chlorinated hydrocarbons in gonads and flesh of specimens which had been collected during 1971-72 and kept in frozen storage; these provided relatively good coverage of the nearshore waters between Point Dume and Newport Beach. The samples were processed by standard chemical procedures and analyzed by electron capture gas chromatography. Resultant DDT and PCB concentrations in the flesh samples are illustrated in [Figures 1](#) and [2](#).

These data indicate that the federal limit of 5 ppm for DDT or PCB compounds is not being exceeded in flesh of crabs collected from around the vicinities of the major submarine municipal outfalls. However, [Figure 1](#) clearly illustrates that the Palos Verdes specimens had the highest concentrations of DDT; levels were several times lower in samples from Santa Monica and San Pedro Bays. Unidentified crabs purchased in Ensenada, Baja California, had very low DDT concentrations. The average value there was less than one percent the average for Palos Verdes Peninsula.

The pattern of PCB 1254 concentrations shown in [Figure 2](#) is distinctly different than that for DDT. Values are remarkably similar along the coast, including those for samples collected near Ensenada. It does appear that PCB 1254 levels in flesh of crabs living near the 7 mile outfall in Santa Monica Bay are significantly higher than those in flesh of crabs from other sections of the Bay. (This was also the case for DDT). In general however, PCB 1254 contamination of the benthic crustacean appears to be low but widespread in our coastal waters.

A second aspect of this study was the concentrations of these synthetic organics in the reproductive organs. The Bight wide distribution of both DDT and PCB compounds in crab gonads followed the same general pattern as for flesh. The specimens from around Palos Verdes had the highest concentration of DDT in the gonads, and values for PCB 1254 had no distinct pattern.

Gonad to flesh concentration ratios were compared for both the female and male specimens collected throughout the sampling region. The female ratios were 23 for total DDT and 11 for PCB 1254; males were 6.5 for DDT and 8.8 for PCB. These results illustrate that the gonadal tissues contain, on the average, concentrations of these synthetic organics five to twenty times those of the flesh. However, in crabs with an average carapace width of 125 mm, the gonads constitute only 27 percent of the combined weight of flesh and gonad tissues for females, and 7 percent for males. Table 1 indicates that despite their relatively smaller mass, the female gonads still carry an absolute tissue burden of DDT compounds 6 times greater than that for flesh; of PCB 1254, almost 3 times greater. In male crabs however, the flesh has a higher absolute burden of both constituents.

As the reproductive organs of this crustacean are exposed to considerably higher levels of these synthetic organics than is the flesh, spawning may represent a significant distribution mechanism of these contaminants in the marine ecosystem, and a significant factor in the elimination of a large percentage of the body burden of these materials from the crab. The longterm effects of such DDT and PCB concentrations on reproduction or other biological processes in this crustacean presently are unknown.

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## FIGURES

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**Figure 1.**

Total DDT concentrations (mg/wet kg) in flesh taken from the crab, *Cancer anthonyi*, 1971-72



**Figure 2.**

PCB 1254 Concentrations (mg/wet kg) in flesh taken from the crab, *Cancer anthonyi*, 1971-1972.

