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The objective of BASELINE is to publish short communications for the concentration and distribution of elements and compounds in the marine environment. Only those papers which clearly identify the quality of the data will be considered for publication. Contributors to Baseline should refer to 'Baseline—A Record of Contamination Levels' (*Mar. Pollut. Bull.* **13**, 217–218).

Chlorinated Pesticide Residues in Marine Sediments

A number of organochlorine pesticides residues, aldrine, gamma BHC, dieldrine, and DDT were detected and quantified from the marine sediments collected along the east coast of India by gas chromatography using an electron capture detector. Almost all the sediment samples collected off the east coast of India contained aldrine, gamma BHC, and DDT and a few of them contained dieldrine. The contamination of the coastal sediments by pesticide residues is derived from the influx of large amounts of pesticide in contaminated river water into the Bay of Bengal. Concentration ranges of all these pesticide residues detected were, aldrine: 0.02–0.53, gamma BHC: 0.01–0.21, dieldrine: 0.05–0.51, and total DDT: 0.02–0.78, all in $\mu\text{g g}^{-1}$ (wet wt).

Very few data are available for the concentration of chlorinated pesticides in the seas around India (Jenson

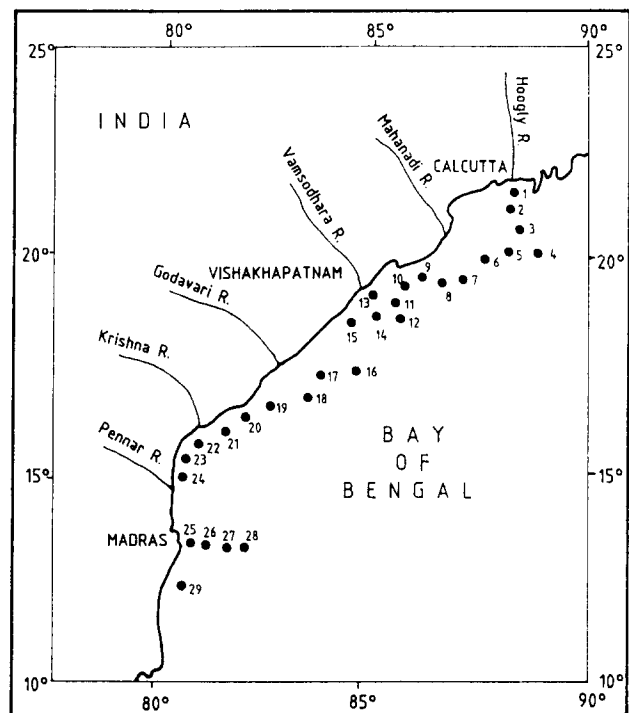


Fig. 1 Location of sample collection sites along the east coast of India.

et al., 1972; Tanabe *et al.*, 1980; Kurieshy *et al.*, 1978; Kannan & Sen Gupta, 1987). As India is predominantly an agricultural country, large quantities of pesticides (55 000 t) have been in use in agriculture for many years.

Sediment samples were collected during cruises (No. 141, 27 Sept.–6 Oct., 1984; No. 155, 26 May–10 June,

1985; No. 157, 30 Sept.-3 Oct., 1985) of R.V. Gaveshani, with a Peterson grab as shown in Fig. 1. Immediately after collection, the samples were wrapped in aluminium foil and stored in a deep freeze on board.

Residues of different organochlorine pesticides were extracted from the sediments according to the methods described by Wheeler & Thompson (1981). With a known quantity of different EPA standard samples (PP'-DDT, OP'-DDT, PP'-DDE, OP'-DDE, PP'-DDD, and OP'-DDD) spiked into the sediments, the percentage of recovery was found to be between 95-98.5%. A Perkin-Elmer 3920 B GC equipped with Ni⁶³ electron capture detector and a glass column (3.65 m × 0.63 cm) packed with 25% OV-17+2.5% QF-1 on 80-100 chromosorb W-AW was used. The samples were run at a column temperature of 200°C, injector at 225°C, and detector, 245°C under an argon (5% methane) gas flow of 75 ml min⁻¹. Residues were detected and quantified with reference to EPA standards (Moye, 1981; El-Dib & Badway, 1985). The

accuracy and precision of the measurement was within the limit $\pm 0.0001 \mu\text{g g}^{-1}$. The variation of the level of concentration of the residues of different organochlorine pesticides in the sea-sediments is illustrated in Fig. 2.

Variability in the concentration of the residues of different organochlorine pesticides in the coastal sediments may be attributed to the presence of a number of rivers all along the east coast of India such as the Hooghly, Mahanadi, Vamsodhara, Godavari, Krishna, Penner, and Palar rivers. Most of the sediment samples were collected from the mouth of these rivers. The highest concentration of aldrine (0.53) was present in the sample collected from the Palar river, whereas that of BHC (0.21 ppm), dieldrine (0.51 ppm), and total DDT (0.78 ppm) were from the mouth of the Mahanadi, Hooghly, and Palar rivers respectively. Total DDT includes the sum of the concentrations of PP'-DDT, OP'-DDT, PP'-DDE, OP'-DDE, PP'-DDD, and OP'-DDD.

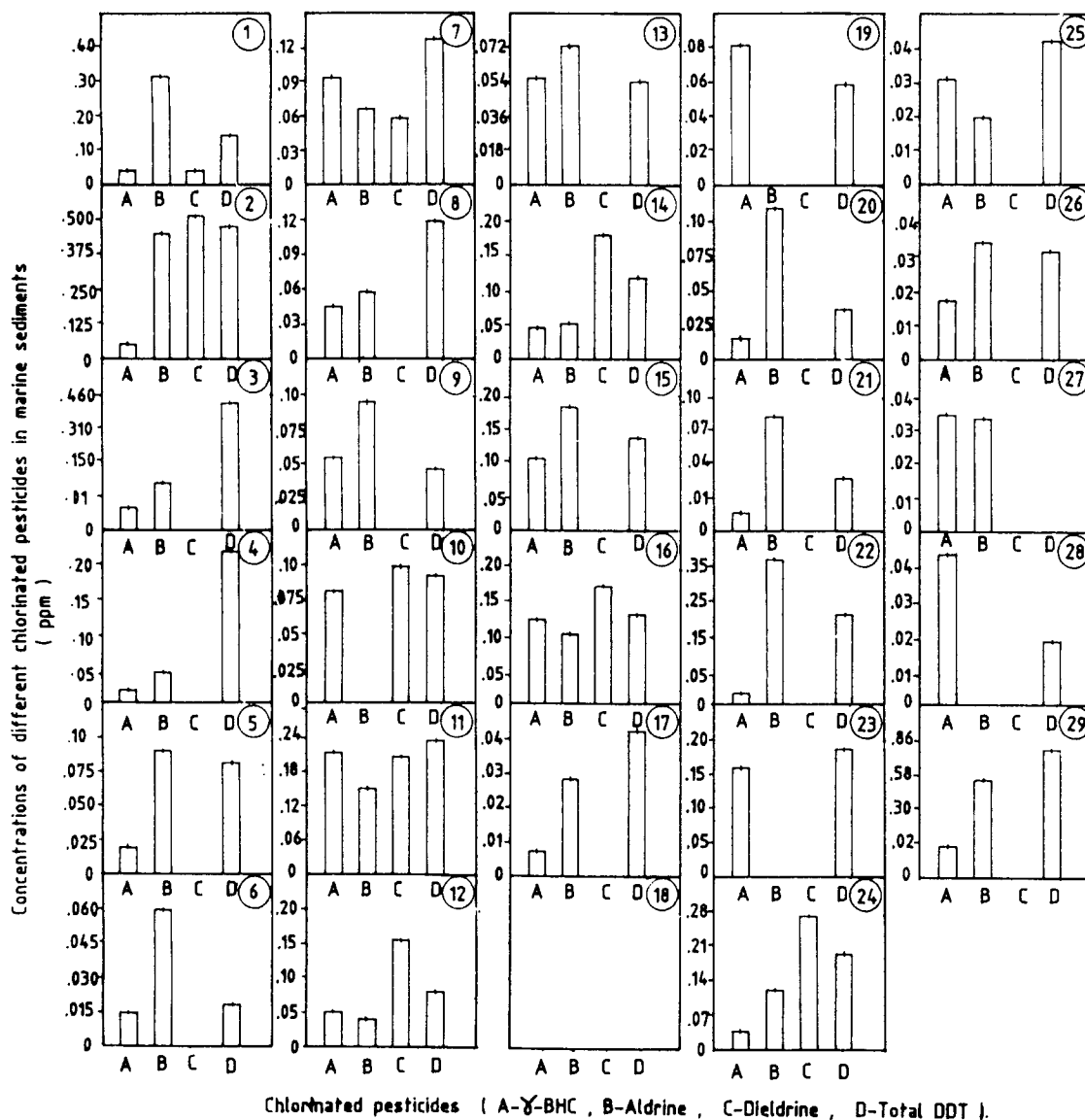


Fig. 2 Variation in the concentration of chlorinated pesticide residues in marine sediments along the east coast of India. Vertical lines indicate S.D. of five samples. Circled numbers refer to sample sites.

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Chlorinated Hydrocarbons in Mussels and Some Benthic Organisms from the Northern Adriatic Sea

During 1984-86, a survey was carried out to measure concentrations of chlorinated hydrocarbons (DDTs and PCBs) in mussels and some benthic organisms from the Northern Adriatic Sea.

In mussels a significant correlation was obtained between PCBs, DDTs, dry weight, and fat content. The range for PCBs varied from 3.2-12.1 ng g⁻¹ and for DDTs from 2.1-18.3 ng g⁻¹. The distribution of the chlorinated hydrocarbons (PCBs and DDTs) in benthic organisms in the N. Adriatic Sea was quite uniform regardless of season and feeding habit; values for DDTs and PCBs were between 4.1-30.9 ng g⁻¹ and 4.7-72.2 ng g⁻¹, respectively. Concentrations of chlorinated hydrocarbons were generally lower and comparable with those reported for other areas of the Northern Adriatic Sea.

In mussels seasonal variations of the chlorinated hydrocarbons (DDTs and PCBs) were correlated with dry weight and extracted organic matter (EOM). Benthic organisms used in the study are representative of ≈90% of the macrobenthos of the Northern Adriatic (Fedra *et al.*, 1976), and are useful in understanding the distribution of pollutants in an ecosystem.

The benthic organisms were sampled by repeated tows with a dredge, wrapped in aluminium foil and stored in a deep freezer until analysed. Mussels were taken manually in Limski canal, seasonally. Extraction and gas chromatographic analysis of the DDTs and PCBs were performed according to UNEP, 1986. Analytical accuracy was checked by analysing dried mussels, shrimps and fish reference material provided by the International Laboratory of Marine Radioactivity as part of an intercalibration study.

Chlorinated hydrocarbons (Table 1) in mussels of the Limski canal (Fig. 1) indicate an almost homogeneous distribution. Although a seasonal pattern in mussels is not clearly obvious, a good correlation was obtained between dry weights of the mussels and DDTs ($r=0.70$,

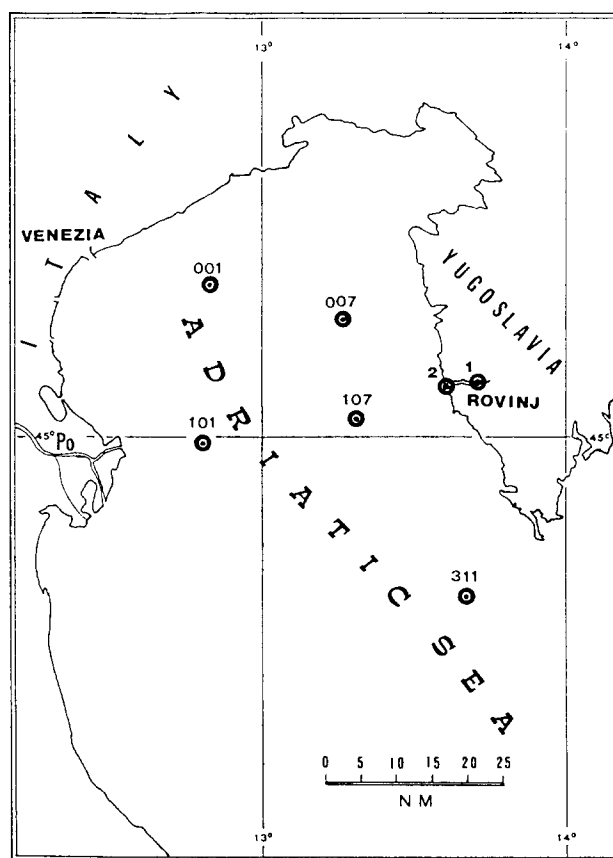


Fig. 1 Sampling stations in the Northern Adriatic and Limski canal.

$P < 0.05$) and PCBs ($r=0.77$, $P < 0.05$). Extracted organic matter showed considerable fluctuations during the year and correlated significantly with DDTs ($r=0.81$, $P < 0.05$). These correlations show that pollutant content changes depend on the annual reproductive cycle (i.e. weight changes) of the mussels (Najdek & Sapunar, 1987). Generally, DDTs concentrations tended to decrease during the three years of the study. With PCBs and extracted organic matter a limited correlation $r=0.51$ ($P < 0.05$) (Fig. 2) was obtained which indicates that variations in the mussels' lipid cycle might be responsible for variations in PCBs as previously suggested (Marchand *et al.*, 1976).

Results for the analysis for chlorinated hydrocarbons in benthic organisms are summarized in Table 2 for the