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Atlantic plankton pollution shocks scientists

by GERALD LEACH, our Science Correspondent

PLANKTON samples throughout the whole Atlantic ocean have been found to contain such unexpectedly high levels of industrial pollutants called PCBs that marine biologists are pressing for an immediate international conference.

The discovery, which comes as a complete surprise, was made by the first survey ever carried out to measure PCBs (polychlorinated biphenyls) in the open oceans.

The survey, by the Woods Hole Oceanographic Institute, Massachusetts, was completed last month after a year spent collecting and analysing hundreds of samples of plankton and fish from an area stretching from the Antarctic to the Arctic and from the Americas to Africa and Europe.

The survey found that levels of PCBs—chemical cousins to the pesticide DDT—are roughly 10 to 100 times higher in plankton from the open ocean than from coastal waters, where one would expect greater contamination from river pollution and dumping of industrial wastes. (PCBs are mainly used in paints and varnishes and as electrical insulators; world production is about 50,000 tons a year.)

Actual levels found in plankton—the tiny plants and animals on which all marine life eventually depends for food—ranged from 0.1 to 1.5 parts per million (fresh weight). These are extraordinarily high figures when compared to those for plankton in coastal waters—usually around .01 to .05 ppm. They are also much higher than levels of DDT contamination in the open oceans—usually put at .01 ppm for plankton.

Another shock finding is that the plankton contained roughly 10 times as much PCBs as did other marine organisms — particularly fish. This contradicts the well-worn idea that pollutants are progressively concentrated as they pass up the 'food chain'—the process in which little fish eat plankton, bigger fish eat the little fish, and so on.

Dr George Harvey, the survey's leader, told me last week that, in many food chains, they found that PCB contamination decreased the higher up the chain they went. All the findings suggest that fish and plankton get most of their PCBs (and by implication other pollutants) directly from the water, not from lower animals.

This finding in turn has several important implications for marine pollution. One is that PCBs must be reaching the plankton mainly by 'wash out' from the atmosphere—suggesting that the biggest primary source is not river pollution or dumping at sea (both easily controllable), but the burning on land of such things as old paint-covered wood.

Dr Harvey estimates that PCBs last more than 100 times as long as DDT (itself highly persistent) in other words, at least 500 years.

For this reason, the ban imposed last March by Monsanto Ltd, the leading manufacturer, on sales of PCBs for anything but totally enclosed use (e.g. inside sealed electrical equipment) won't be very effective in lowering ocean contamination by PCBs. The only hope is that marine life will do the job itself by absorbing PCBs and carrying them to the bottom of the ocean, out of harm's way, when they die.

Last week British marine biologists specialising on PCBs expressed varying degrees of surprise and cautious scepticism about the survey's findings. Yet all of them confirmed—with feelings of unease—that no work has yet been done anywhere in the world to assess the effects of PCBs on the health or ecological patterns of marine organisms.

There are only suspicions to go on. PCBs are widely thought to act like a weaker version of DDT, which is known to upset subtle but important behaviour and reproductive patterns in fish even at extremely low levels. PCBs were also thought to have contributed to the death of more than 12,000 sea birds in the Irish Sea in 1969.

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