New Puzzle Posed by PCB Pollution



By Bill Clede

Polychlorinated biphenals (PCB) are causing a controversial puzzle that raises many unanswered questions. And the finger of accusation may be pointing prematurely.

PCB's have been found by chemists testing fish and wildlife samples for residues of pesticides such as DDT.

"It is simply astounding that the amounts of PCB being reported could possibly be present in our environment," said Tom C. Ford of Monsanto, only commercial producer of PCB in the United States.

He explained that there just isn't the opportunity for PCB's to be introduced into nature.

Polychlorinated biphenals are a class of hydrocarbon chemicals with many industrial uses. They are used primarily as insulating fluids in electrical transformers and capacitors. They are added to a polymer to make certain plastics and adhesives or surface coatings.

Although PCB's are similar to DDT, dieldrin and other chlorinated hydrocarbon pesticides, they have no agricultural use.

"PCB's would make lousy pesticides," Ford explained. "It takes 120 milligrams of DDT per kilogram of animal weight to kill a rat. It would take 5,000 to 10,000 milligrams of PCB."

In industrial uses, PCB's are self-contained. The transformer is sealed. In heat-transfer applications, the PCB fluid functions in a closed system.

In plastics, they become part of the solid material itself.

But "plastics" is a broad term.

"Now food storage bags are virtually all made of polyethylene which contains no PCB's at all." Ford reassured us. "There is no requirement of clearance with the Food and Drug Administration."

The linking of PCB with DDT first happened about three years ago. Scientists analyzing pesticide residues in wildlife, found unidentified "interfering" substances in the same range as DDT on test equipment.

Professor Gunnar Widmark and Soren Jensen of the Stockholm University Institution of Analytical Chemistry identified the interference as PCB. It shows up a peaks on the graph of a gas chromatograph very near the peaks caused by DDT.

"The gas chromatograph is sensitive," Ford said, "but you really can't make positive identification without a mass spectrometer. We have learned that the Swedes did use one."

Since Monsanto is the sole U.S. producer of PCB, the company has launched research programs hoping to answer new questions raised by chemists.

One is seeking to identify the compounds reported to the PCB's. This involves analysis of environmental samples of air, water, soil and wildlife.

Also underway are studies to determine the biological effects of deliberate dosage of PCB's on fish, birds and mammals.

But neither is complete enough yet to draw conclusions. One chemist has done 5,000 test samples but will not assume any facts until he has finished 10,000.

Dr. Robert Riseborough, a marine biologist at the University of California at Berkeley, tends to clear PCB of blame.

Testifying at the Wisconsin's Natural Recourses Department hearings on pesticides in May, Dr. Riseborough even suggested that DDT has been wrongly blamed for producing thin eggshells in some birds.

"DDE (a breakdown product of DDT) appears to be the environemtntal pollutant most responsible for thin eggshells despite the presence of PCB in some DDE-contaminated birds . . ."

Computer analysis, he said, showed "no significant statistical relationship" between PCB content in pelican eggs and the thickness of their shells. But as DDE contamination increased, "the shells became thinner" in both pelican and double-crested cormorant eggs.

While PCB's are found in large amounts in many marine birds, Riseborough has found only a few in which there were more PCB's than DDT or its forms changed by passing through living tissue.

But it is now a question whether the similarity of PCB's might have confused earlier tests for DDT.

According to Brainerd T. Peck of the State Board of Pesticide Control, tests made prior to 1968 may not have taken PCB interference into consideration.

With the advent of the gas chromatograph, Lloyd Keirstead of the Connecticut Agriculture Experiment Station says it is not likely that tests within the past couple of years would be confused.

But it's an even bigger question that if these findings of PCB's in fish and wildlife are accurate, where is it coming from?

Chemists have theorized that the source must be industrial wastes. Yet industry spokesmen know of no process that would release these chemicals. Monsanto has carried out a program for several years for the reclamation of used PCB's for re-use.

The only definite statement anyone will make is that these questions will surely expand the scope of research — but there won't be any quick and ready answers.

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