



The researchers found that most of the chlorinated hydrocarbons, at a concentration of 1 ppm for 4 hours, decreased plankton productivity 50-90 percent. Another group of pesticides, the organic phosphorous compounds, proved much less toxic.

All life forms in the sea depend on plankton, microscopic plants and animals grouped by billions and inhabiting waters rich with nutrients. Scientists fear that great kills of plankton could be caused by pesticides and not be noticed. Their absence, however, could mean the loss of an entire crop of fish dependent on them for food.

An important part of the research program seeks to learn the significance of pesticide residues. Fish and wildlife have been caught alive, and apparently healthy, which contained levels well above those considered lethal in laboratory tests. These specimens had not taken in at any one time doses large enough to kill them. Over a long period of time, however, they had accumulated and stored the pesticides in their fat. For these specimens, a period of stress during which they would have to use their reserve of fat might prove fatal.

A group of cowbirds in one large cage was put on a diet that included DDT. The birds were later put into individual cages for about 40 minutes and then returned to the common cage. They were fed only clean food thereafter but were moved 3 more times--twice at a weekly interval and once at a biweekly interval. Deaths followed the disturbance of moving, as long as 28 days after the removal of the diet containing DDT. Examination of the dead birds showed that the DDT-contaminated fat was gone from the parts of the body where it is normally stored.

There is accumulating evidence to show that if certain levels of pesticide residues are found in an animal's brain, it can be said that the pesticide caused the death. The researchers found that the brains of eagles which died after being fed various levels of DDT contained very similar quantities of DDT despite differences in dosage levels and the time it took to die. Some researchers believe that similar levels of DDT in the brain and the substances into which the chemical breaks down, can indicate DDT-induced mortality over a wide range of bird and mammal species.

The research program of the Fish and Wildlife Service also seeks to compare the relative toxicity of many pesticides to fish and wildlife so that the least toxic ones can be used against pests. In an acute lethal test, comparing the relative toxicity to both white quail and mallard ducks of DDT with 5 other pesticides, it was found that endrin was about 50 times more toxic than DDT. The other pesticides--dieldrin, aldrin, chlordane, and toxaphene--fell in between.

Several findings indicated that certain pesticides applied at rates sufficient to kill insects offer relative safety to birds and mammals. In the control of Dutch Elm disease on a university campus,

methoxychlor proved less hazardous to nesting robins than DDT. Malathion, applied at rates sufficient to kill insects, was relatively safe for birds and mammals.

The researchers reported too the virtually universal distribution and exchange of pesticides among living animals, their foods, and the air, water, and soil. It has become difficult to find uncontaminated material and so museum material from the 1930's or earlier is being sought for research purposes.

Copies of the annual report, "The Effects of Pesticides on Fish and Wildlife," 1964, Circular 226, may be obtained without charge from the Fish and Wildlife Information Office, Department of the Interior, Washington, D. C. 20240.

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