## UNITED STATES DEPARTMENT of the INTERIOR

FISH AND WILDLIFE SERVICE

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MERE TRACE OF PESTICIDE KILLS AQUATIC LIFE, INTERIOR DEPARTMENT STUDY REVEALS

Research by Department of the Interior scientists has revealed that amazingly small amounts of pesticides can kill shrimps, crabs, and other aquatic life, the Department said today.

One part of DDT in one billion parts of water (1 ppb) was found to kill blue crabs in 8 days. One part per billion, the Department said, is the relationship one ounce of chocolate syrup would bear to 10 million gallons of milk.

These and other new findings on the dangers of certain chemicals to wildlife are given in the Department's Fish and Wildlife Service 1964 annual report on pesticide research which has just been released. The purposes of the continuing study are to determine the kinds and amounts of pesticides that are injurious to fish and wildlife and to assist in discovering ways to achieve pest control with least hazard to fish and wildlife resources.

The researchers found that commercial brown and pink shrimp exposed to less than half of one part of heptachlor, endrin, or lindane in one billion parts of water were killed or immobilized in 48-hour laboratory tests. These chemicals, like DDT, are chlorinated hydrocarbon insecticides. In the laboratory, paralyzed fish or shellfish may live for days, even weeks. But in the sea, where only the fittest survive, death may result almost immediately, the report says.

Under experimental conditions, the oyster detects and stores pesticides present in the water at concentrations as low as 10 parts per <u>trillion</u>. The report says pesticides stunt the growth of oyster shells. To test oyster growth, the researchers filed off the thin new growth on the edge of the shells, put some oysters in water containing a pesticide, others in clean water. The results became obvious in a few days: the shells of those in clean water grew back; the others showed no perceptible growth. 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 phosphrous 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.

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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 considered the death. The researchers found that the brains of gagles which died after being fed various levels of DDT contained very similar quantities of DDT cospite 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 pasts. In an acute lethal test, comparing the relative toxicity to bomwhite quail and mallake 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, 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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