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USDA SCIENTIST SAYS PREDICTION OF DDT DEGRADATION IN SOIL IS HARD

It is extremely difficult to predict how long it will take for DDT to disappear from soil, according to Dr. Philip C. Kearney, pesticides research group leader for the Agriculture Department.

Dr. Kearney, testifying for the Environmental Protection Agency during hearings October 21-22 and 26-27 on DDT cancellation, said many factors, including volatility, transfer through the soil, and biological degradation, affect DDT persistence. He said spraying procedures produce different persistence patterns than direct incorporation into the soil. Also, he said, soil with a high organic factor tends to retain DDT longer than low organic content soil.

There is evidence that DDT is metabolized and converted into DDE by soil microorganisms, and at an especially rapid rate in aerated soils. There is little evidence of DDE conversion, he added. However, some studies of DDT movement from soils by volatility suggest that DDE is more volatile than DDT, he added.

Dr. Kearney said some studies show higher DDT residues in cities than in surrounding crop lands. He said he could only speculate as to the cause of this unexpected differential, but that mosquito abatement programs may produce some of the high levels in urban areas.

Dr. John B. Dimond, entomology professor, University of Maine, said he no longer recommends DDT in Maine because of environmental draw-backs.

Dr. Dimond explained that since he has been involved in several Maine forest studies, he has detected many side effects of DDT use. Studies conducted since 1964 show that DDT residues and metabolites are much higher in forest soils, robins, earthworms, minks, rabbits, frogs, snakes, toads, trout, and the spruce budworm where areas have been treated with the pesticide than in areas where no treatments have been made. The studies also show accumulative levels in soil and animal species where more than one DDT application is made, he added.

Dr. Dimond said most DDT residues found in forests were concentrated in forest litter. The litter is undecayed twigs and leaves, considered soil by soil experts but of a different composition than the mineral soil below, he explained.

He stated that after several years of not using DDT in a Maine forest, test of forest soil revealed no decrease in DDT concentrations. He pointed out, however, that humus soil in forested areas has an acid content that tends to bind DDT, and results of forest sampling may not be applicable to cultivated soil exposed to sunlight, which is a degradation factor in DDT.

He also said airplane pilots spraying forests with DDT had endeavored to shut of the pesticide spray when passing over obvious bodies of water. But he said smaller streams and lakes, including habitats for some sport fisheries, may not have been observable from the air and the planes would then have continuously applied the pesticides over forest and water.

Although DDT has been discontinued in Maine for forest application, one of its control targets, the spruce budworm, could have a devastating effect on spruce and fir trees, destroying wildlife habitat and increasing the risk of forest fires, he testified.

He said he could not speculate on the magnification of DDT in earthworms, as compared to soil, and added that more research is needed to determine the threshold of sublethal effects on wildlife from pesticide concentrations.

DDT Transport to Water

It is well documented that DDT enters water and how it is transported, according to Dr. H. F. Nicholson, chief of agricultural and industrial water pollution control at EPA's Southeast Water Laboratory, Athens, Ga.

Dr. Nicholson said DDT enters water by runoff with rainwater from the land surface, through municipal storm drainage systems and sewers, through carelessness or accident, by transport through the air as spray drift or on airborne soil particles with subsequent fall out, and through industrial sewers from manufacturing or formulating sources. It is believed that world-wide distribution of DDT is accomplished largely by air and water movement, he added.

Dr. Tony J. Peterle, professor and chairman of the Zoology Department, College of Biological Scientists, Ohio State University, said his work determined that DDT residues appear in places distant to areas of application.

Dr. Peterle said he discovered DDT in Antarctic snow where DDT has never been used. He explained that he used DDT labeled with radioactive chlorine 36. The radioactivity rather than DDT is measured, he added.

Gas Chromatography

William L. Reichel, of the Interior Department's Patuxent Wildlife Research Center, testified on use of gas chromatography to separate evidence of polychlorinated biphenyls (PCBs) from that of DDT and DDE. He said that PCBs can interfere with analysis of DDE only when it is evident in ratios of 15:1 or greater, which is rare.

John A. Burke, of the Food and Drug Administration's Division of Chemical Technology, also described use of gas chromatography to detect and isolate PCBs from DDE. He said no evidence of PCBs had been found in fruits and vegetables, and the highest ratio was found in Lake Michigan chub.

Mr. Burke said that PCBs neither invalidate nor bias DDE data. In measuring DDE, very often the presence of PCBs is not detected, he added.

He said gas chromatography is only one of a number of techniques for isolating and identifying DDT and DDE, adding that nitration is not an adequate method of separating DDE and PCBs.

Dr. David L. Stalling, chief chemist of the Interior Department's Fish-Pesticide Research Laboratory, Columbia, Mo., said that gas chromatography is "unequivocably" the best way to define and separate DDT, DDE, and PCBs. He also said that PCBs must be present in large quantities before they become a problem.

Attorneys for the Agriculture Department and for Seifert, Conner, and Cuneo, Washington, representing the 27 group petitioners, objected to EPA's procedure. They complained that EPA was deleting the right of cross-examination because the agency was calling expert witnesses who were spending more time summarizing the work of other authorities than on their own work. Such a procedural manner makes it impossible for cross-examination on detail, they added. The objection was overruled.

Agriculture Department Witness

A DDT ban would have a detrimental effect on developing nations, according to Dr. Wayland J. Hayes, head of the Toxicology Department, Vanderbilt University.

Dr. Hayes, testifying for the Agriculture Department, said that even if the ban were accompanied by an environmental explanation and even if U.S. manufacturers were allowed to continue to produce DDT for export, there would be some effect on developing nations.

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