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Arkansas Scientist Reports on Herbicide Exposure Studies

MIAMI--Findings from studies that determined how much herbicide was absorbed into the bodies of forest workers applying herbicides were presented Thursday (May 2) by Dr. Terry L. Lavy, professor of agronomy at the University of Arkansas - Fayetteville, at the American Chemical Society's 189th national meeting here.

Lavy, director of the Pesticide Residue Laboratory at the University of Arkansas, reported on applicator exposure to the commonly used forest herbicides 2,4-D, dichlorprop and picloram. The research was conducted with the cooperation of 80 forest pesticide applicators in nine locations in Arkansas, Mississippi and Oklahoma. The applicators provided the researchers with all of the urine they excreted during the 12 day study period.

Research has shown that at least 90 percent of the amount of these compounds that is absorbed through the skin is excreted in the urine within five days, Lavy said. Therefore, analysis of the urine of the applicators provides a measure of the amount of chemical absorbed through the skin. Lavy also stated that the amount applicators absorb through the skin is much greater than the amount inhaled.

The toxicological significance of the amounts of herbicides absorbed by the workers was determined using the "no observed effect levels" that are widely accepted by regulatory agencies, researchers and the industry. A margin of safety was determined by dividing the "no observed effect level" by the dose absorbed by workers.

The most exposed workers were those using backpack sprayers. The margin of safety for 2,4-D ranged from 245 for the backpack crew to 5,581 for the injection bar crew. If a worker has a margin of safety of 245, this means he could have absorbed 245 times more than he did before he would reach the "no observed effect level". Picloram margins of safety were as high as 943,400.

The study was designed to compare exposure levels of workers applying the herbicides with ground application tools who took no special precautions to those who used a set of simple preventive measures, which included wearing new leather gloves and boots each day. The new gloves and boots significantly reduced exposure for all workers except those using backpack sprayers, apparently due to the high degree of spray contact with other parts of their bodies.

Lavy has conducted nine worker exposure studies with eight different herbicides and insecticides. Workers involved with mixing or batching pesticide concentrates received a higher absorbed dose than those applying diluted sprays. In each case he has found that health-threatening levels of exposure did not occur.

He adds, however, that it is always wise to limit exposure to chemical products. Practices to reduce exposure include washing hands before eating, before using tobacco, and before using the bathroom; immediately washing with soap and water any skin on which pesticide is spilled; showering and changing clothing soon after exposure; and wearing clean clothing, including waterproof boots and gloves, during application.