

# Uptake of C<sup>14</sup>-DDT from Soil by Alfalfa<sup>1</sup>

by G. W. WARE, B. J. ESTESEN, and W. P. CAHILL  
*Department of Entomology, The University of Arizona,  
Tucson, Arizona*

This reports the completion of the last two of three related studies (1).

The second experiment involved planting alfalfa seed in sand impregnated with ring-labeled C<sup>14</sup>-DDT at the rate of 4.0 ppm, and a control planting. Cuttings were removed as growth dictated at 89, 158, 226 and 295 days to determine if seed germination in DDT-impregnated soil affects DDT uptake. None of the extracts from these cuttings had count rates, measured by liquid scintillation, significantly above background and counting error, indicating no uptake or translocation of DDT by this method. However, the count rates were consistently higher in the extracts from treated plants.

The third exposure route involved transplanting individual alfalfa plants growing in 4" pots to 6" pots and surrounding the ball with either Gila or Mojave soil containing 7.0 ppm of ring-labeled C<sup>14</sup>-DDT. A total of 0.25 mCi (35 mg) of labeled DDT was used in 6 pots. Here the purpose was to determine uptake and translocation by new rootlets penetrating treated soil.

Thirteen cuttings were made over an entire calendar year at 15, 39, 60, 92, 124, 183, 217, 234, 264, 297, 329, 354, and 374 days. Again, as in the first two experiments (1), none of the cutting extracts showed radioactivity significantly above the controls, though the count rates were normally slightly higher in the treated plants.

Soil samples were collected from the treated and control pots with a cork borer in the middle of the test at the February cutting, Soxhlet-extracted and counted. The count rates in the table indicate uniform soil impregnation.

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At the final alfalfa sampling, soil and roots were also collected. After thorough washing the root hairs were separated from the roots, and each portion was weighed, extracted by mincing with a 1:2 mixture of ethanol and hexane and cleaned on a Florisil column. The extract volumes were evaporated to near dryness and transferred to vials for counting. The count rates shown in the table indicate a high degree of C<sup>14</sup>-DDT adsorption on the roots and root hairs. The greater adsorption by root hairs would appear to be surface related.

From the three tested methods of alfalfa root exposure to C<sup>14</sup>-DDT impregnated soil, (a) an emulsion injected around roots (1), (b) seed germinating in treated soil, and (c) plants surrounded by a layer of treated soil, it appears that DDT translocation from contaminated soil to the above-ground parts is not a route of significant forage contamination.

TABLE

Liquid scintillation counting rates of extracts from soil, roots and root hairs from potted alfalfa growing in C<sup>14</sup>-DDT-impregnated soil.

Sample	Soil Type	Net Counts/min/gm
<u>Mid-test Sampling</u>		
Soil	Mojave	30,224
		25,449
		30,668
		$\bar{X} = 30,113$
	Gila	39,128
		36,300
		30,630
		$\bar{X} = 33,686$
<u>Final Sampling</u>		
Soil	Mojave	30,590
	Gila	60,107
Roots	Mojave	24,784
	Gila	17,398
Foot Hairs	Mojave	1,160,270
	Gila	863,300

#### REFERENCE

1. G. W. WARE, J. Econ. Entomol., 61, 1451 (1968).