EFFECTS OF SOME CHLOROCARBONS ON SOIL INVERTEBRATES.

W. Frank[1)], H. Frank[1)], W. Jans[2)], and W. Funke[2)]

1) Institut für Toxikologie, Universität Tübingen,
Wilhelmstraße 56, D-72074 Tübingen
2) Biologie III, Ökologie und Morphologie der Tiere
Universität Ulm, D-89069 Ulm

Airborne short-chain aliphatic halocarbons (SCAH's) occur in soil air at similar levels as in the atmosphere. An experimental study has been undertaken to assess the effects of chloroform, trichloroethene and tetrachloroethene on the abundances of soil invertebrates. In a well-characterized experimental area of spruce forest near Ulm, plots of 0.2 square meter have been covered by photo-eclectors (emergence traps). Group distribution, abundance and activity densities of arachnidae, crustaceae, myriopodae and insects were determined during exposure to the above-mentioned SCAH's at air concentrations of 10 and 100 mg/m^3 soil air. The halocarbons have been administered to the air within the eclectors by means of thermostated diffusion tubes of appropriate dimensions; levels in soil air have been regularly determined by gas chromatography.

Significantly decreased abundances of nematocera were observed at low and high concentrations of all three SCAH's, asccompanied by increased abundances of staphylinidae and brachycera . Strong reductions were also found for nematoda and enchytraeidae.

These results demonstrate that ecotoxicological effects are elicited by the studied SCAH's at levels hundred- to thousand-fold lower than the threshold limit values acceptable for human exposure at the work place. The concentrations in these experiments exceed those found in soil air of relatively non-polluted areas, such as the National Park of Berchtesgaden, by factors of 10^3 to 10^4, but after accidental spills of SCAH's such concentrations are not uncommon in soil air.