

SUMMARY AND CONCLUSIONS

A short-term exploratory study was made of the soil ecosystem in a ragweed-dominated field. An integrated ecosystem approach was used to examine several major characteristics of the soil community: insecticide response to diazinon, broad trophic relationships of the major faunal groups, and mineral distribution. Radioisotope methodology was utilized for food web and mineral cycling aspects of the study. The results showed:

1. Heavy diazinon application (40 lbs/acre) significantly reduced all major soil invertebrate populations except nematodes. Apparently diazinon is species specific in its control of these latter organisms. Earthworms were the only group to repopulate the plots during the study. Differential response of soil populations to lower diazinon levels has been previously demonstrated. This high dosage is well above threshold levels for a lethal dose.

2. The tagging technique used most frequently in above-ground food webs is adaptable to below-ground systems. With ragweed as a point of injection, P^{32} was detected in macroarthropods, earthworms, and nematodes, but not in microarthropods. Their minute biomass coupled with the isotope dilution occurring in transfer to these

small saprovores may have been the cause.

3. Large but consistent variability occurred in radioisotope uptake by the fauna. Non-randomly distributed activity densities within populations were found. A complex of environmental and physiological factors influences the uptake and metabolism of a radioisotope at each trophic level. Such variability has only infrequently been reported for radionuclide uptake into natural food webs.

4. Differences between uptake curves of the several faunal groups were used to hypothesize their trophic relationships. A preliminary study, as this is, is most useful in providing basic hypotheses and direction to further long-term research where larger sample sizes and greater taxonomic detail can be employed.

5. The significance of various paths of P^{32} movement through the soil-ragweed system was evaluated. The ragweed maintained the bulk of the radioisotope during the study, although the importance of the soil as the ultimate reservoir was apparent within three to four weeks. Although significant amounts of P^{32} may have been present in the stem flow relative to that in the soil fauna, both fractions contained negligible amounts of the total P^{32} present. A general reduction of phosphorus concentration occurred in transfer to herbivores and saprovores of the soil food web. Such P^{32} dilutions have been recorded in other studies, although

some herbivorous insects are known to concentrate this element.