

California Department of Food and Agriculture  
Environmental Monitoring and Pest Management  
1220 N Street, Room A-149  
Sacramento, CA 95814  
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MONITORING THE PERSISTENCE AND MOVEMENT OF 1,2-D,  
A COMPONENT OF TELONE II FUMIGANT, IN LILY BULB FIELD SOILS

I. INTRODUCTION

Ground water contamination by 1,2-D (1,2-dichloropropane) was discovered in the Smith River Plains area of Del Norte County as a result of an investigation by the North Coast Regional Water Quality Control Board (NCRWQCB) in 1982. The 1,2-D was a component of D-D soil fumigant used extensively in the area to control nematodes in lily bulb fields. Use of D-D was suspended by the County Agricultural Commissioner in 1983 after the ground water contamination was discovered. Since that time, Telone II® soil fumigant (active ingredient 1,3-dichloropropene), which contains no more than 0.5% 1,2-D, has replaced D-D as the standard preplant soil treatment in lily bulb production fields. Although the 1,2-D component of Telone II is only a small fraction of the amount contained in the D-D fumigant, it still results in the application of up to 2 pounds/acre of 1,2-D after treatment.

Although D-D has not been used since 1983, 1,2-D is still being found in ground water samples collected by the NCRWQCB. Concentrations of 1,2-D fluctuate indicating that additional 1,2-D may still be moving into the ground water. A field used for lily bulb production is typically fumigated only once every 4 to 5 years after which a bulb crop and then pasture is grown on the land as a rotation until the next fumigation is applied. Information is needed on the possible role of Telone II fumigations as a potential source of additional 1,2-D contamination of ground water.

## II. OBJECTIVE

Study the effect of rainfall and irrigation on the leaching of 1,2-D by determining the distribution of 1,2-D in soil before and after the winter rains and after summer irrigation.

## III. PERSONNEL

This project will be conducted by the Environmental Hazards Assessment Program under the overall supervision of John Sanders, EHAP Program Supervisor. Other key personnel include:

Project Leader - Don Weaver

Senior Staff Scientist - John Troiano

Study Design/Data Analysis - John Troiano

Field Sampling - Chris Collison

Lab Liaison/Quality Control - Nancy Miller

Agency and Public Contact - Madeline Ames

ALL QUESTIONS REGARDING THIS STUDY SHOULD BE DIRECTED TO MADELINE AMES AT ATSS 454-8916 or (916) 324-8916.

#### IV. STUDY PLAN/EXPERIMENTAL DESIGN

The purpose of the study is to determine the distribution of 1,2-D in soil of lily bulb fields before and after the winter rain season and again after the summer irrigation season. The study data will indicate how rapidly 1,2-D leaches towards ground water after rainfall or irrigation has been applied and what levels of 1,2-D persist in soil and may move towards ground water.

Because of the problems associated with contamination of ground water by nematicides in the proposed study area, it may be difficult to obtain permission to sample in the desired number of fields. Therefore, three possible sampling designs are presented and the number of fields that are made available for sampling will determine which sampling scheme is used.

- A. 6 fields X 1 15ft core/field = 180 samples
- B. 3 fields X 2 15ft cores/field = 180 samples
- C. 2 fields X 3 15ft cores/field = 180 samples

Since soil cores would be collected three times during the study, a total of  $3 \times 180 = 540$  samples would be collected. However, if analytical results show that 1,2-D is not detected in cores from the first or second sampling, then the next set of samples would not be collected.

Once permission to sample fields has been obtained, background cores will be collected near the edge of each field but not in the area treated with Telone II. Because the soils in the study area are gravelly and coarse we would need to be certain that the drill rig could be used in each field before attempts to collect samples for 1,2-D analysis are made. Further, background core samples will be analyzed for texture, organic carbon content, and pH. The first samples for 1,2-D analysis will be collected from the fields in September, before the beginning of the winter rain season.

An ANOVA will be used to statistically compare the mean depths at which 50% or 90% of the mass of 1,2-D applied is recovered on each of the sampling dates. Depths at which 1,2-D is recovered from soil will be used to determine rates at which it has leached during each sampling interval.

#### V. SAMPLING METHODS

Soil coring will be conducted using a truck-mounted drill rig with hollow stem augers and a split barrel sampling system. Soil samples will be collected in 6-inch-long stainless steel cylinders that are contained in the split barrel. Each sample will be capped at both ends and frozen immediately on dry ice. Samples will be kept frozen until extraction.

## VI. CHEMISTRY METHODS/QUALITY CONTROL

Standard analytical methods and quality control procedures will be followed.

## VII. TIMETABLE

|                 |  |
|-----------------|--|
| August, 1989    | Locate fields, take cores for texture. |
| September, 1989 | Collect pre winter rain cores          |
| April, 1990     | Collect post winter rain cores         |
| August, 1990    | Collect post irrigation cores          |
| October, 1990   | Chemical analysis complete             |
| December, 1990  | Data analysis complete                 |
| March, 1991     | Draft report                           |

VIII. BUDGET

|   |           |
|---|-----------|
| Personnel expenses .....                        | \$4,500   |
| Chemical analysis 540 samples @ \$200/sample... | 108,000   |
| TOTAL   | \$112,500 |