

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
CENTER FOR DISEASE CONTROL  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
CINCINNATI, OHIO 45226

SUPPLEMENT TO  
HEALTH HAZARD EVALUATION DETERMINATION  
COMPOSITE REPORT ON THIRAM FOR HHE 75-137-354

THE HOEDADS  
EUGENE, OREGON

DECEMBER, 1976

I. INTRODUCTION

The National Institute for Occupational Safety and Health received the request for a hazard evaluation from a representative of the Hoedads Cooperative, Inc. This Supplement to the Composite Report on Thiram contains specific data on work process, study conduct, and results for the Hoedads. A discussion of the findings and the conclusions drawn from the study as a whole are contained in the Composite Report.

II. HEALTH HAZARD EVALUATION

A. Description of Process

The Hoedads plant reforestation trees under contract to various land holders such as lumber firms, the U.S. Forest Service, etc. During this survey they were planting bare root trees that were not Thiram treated for the U.S. Forest Service.

Although this cooperative has planted Thiram treated trees in the past, by policy they were not planting such trees this planting season.

Individuals in the planting crews are allowed considerable latitude in living accommodations and in the length of their work day and week. Except when planting within commuting distance of Eugene, Oregon, most crew members camp out in tents or pickups. Some crew members work continuously without a day off for up to three weeks. Estimated trees per day per man varied from 250 to 1000 with most averaging in the 400-500 range.

B. Study Progress and Design

1. General

The environmental-medical evaluations were conducted on two separate occasions. The first occasion was on March 11 and 12, 1976. The "Potluck" crew was to be planting near Estacada, Oregon; however, it snowed the night before they

were to begin planting and consequently, they did not plant. A portion of the medical study was conducted at this time. Some of the medical interviews were conducted at the campsite on March 11. The remainder were done at the motel on March 12. No blood was obtained.

The second occasion was on April 7, 1976. The "Cougar Mountain" crew was planting non-Thiram treated trees for the U.S. Forest Service near Cottage Grove, Oregon.

The weather was sunny, few clouds, and there was a slight breeze. The temperature was 55° - 60°F. The planting was halted at 12:30 p.m. due to low humidity. During the morning, most planters did not wear jackets, some rolled up their sleeves and others wore short sleeve shirts. There was no wash water available at the planting site.

Medical interviews were conducted at the work site or in a park on the way home. Pre-exposure bloods were drawn in the field. Post-exposure bloods were drawn in the park. Because the work day was abruptly stopped at noon (1/2 day work period), it was impossible to administer the complete medical questionnaire and physical examination to all workers. The abbreviated questioning included: identifying data, an abbreviated work history, the workers own health assessment and mention of medical problems, history of work with tree planting and Thiram, drinking habits and the post-exposure review for symptoms.

## 2. Environmental Sampling

For this evaluation, seven environmental air samples were collected in the breathing zone of the planters on April 7, 1976. These samples represent a control group for the Thiram study as a whole.

## 3. Medical Sampling

On the visit of March 11-12, 1976, all 11 planters in the planting crew were interviewed.

On the visit of April 7, 1976, 10 planters out of a double crew of 20 were included in the study. Planters were selected who had had prior experience with Thiram treated trees.

Details of age, sex, general work habits and depth of interview are included in Table I C.

## C. Evaluation Results

### 1. Environmental (Table III taken from Composite Report)

As shown in Table III (Company Number 7), none of the seven breathing zone air samples contained detectable amounts (5.0 micrograms) of Thiram on each filter. These samples were collected on April 7, 1976, during the planting of non-Thiram treated trees.



The negative results show that there is nothing else present in the environment or on the trees that would give us a false indication that Thiram was present.

## 2. Medical

Table VIII C shows symptoms developing over the study period and Table IX C gives symptoms reported on detailed questioning.

All of the planters on whom blood pressure and pulse were done were seasoned workers and had had no recent exposure to Thiram. This group was made up of the 14 planters who had had the complete questionnaire with the addition of one planter who had an abbreviated questionnaire but did have her blood pressure taken. The mean values and 95% confidence intervals of the mean for systolic and diastolic blood pressure and for pulse were (respectively):  $110.3 \pm 4.8$  mm Hg ( $n = 15$ );  $64.8 \pm 3.9$  mm Hg ( $n = 15$ );  $66.6 \pm 5.1$  /min. ( $n = 14$ ). Blood pressures below 140 mm Hg systolic and 90 mm Hg diastolic are considered normal. Younger persons would expect to be lower than older adults. There is no defined lower limit of normal in otherwise healthy individuals.

None of the pre-test bloods showed a measurable Thiram level. One of the planters had been exposed to Thiram treated trees in the past few weeks. The other nine planters had had no recent exposure to Thiram. For these 9 planters the mean Dopamine beta-Hydroxylase level was  $56.8 \pm 26.2$  units/liter. The one planter who had had prior exposure to Thiram had a level of 184 units/liter. Theoretically the effects of Thiram would be expected to decrease rather than increase the DBH level.

## III. AUTHORSHIP AND ACKNOWLEDGMENTS

Report Prepared By: Arvin G. Apol  
Regional Industrial Hygienist  
Region X

Theodore W. Thoburn, M.D.  
Medical Officer, Medical Section  
HETAB, NIOSH  
Cincinnati, Ohio

Originating Office: Jerome P. Flesch, Acting Chief  
Hazard Evaluations & Technical Assistance Branch  
NIOSH  
Cincinnati, Ohio

TABLE I C

CHARACTERIZATION FO WORKER SAMPLE  
 THIRAM STUDY, THE HOEDADS COOPERATIVE, INC., EUGENE, OREGON  
 HHE 75-137 March 11 - April 7, 1976

	EXPERIENCE WITH THIRAM			NO EXPER- ENCE WITH THIRAM	GRAND TOTAL
	QUESTIONNAIRE				
	COMPLETE	ABBREV.	TOTAL		
Total Planters Seen	7	7	14	7	21
Age - Mean					25.9
Median					25
Range					19 - 39
Men	6	6	12	3	15
Age - Mean					27.2
Median					26
Range					22 - 39
Women	1	1	2	4	6
Age - Mean					22.5
Median					22
Range					19 - 27
Typical number of days worked before days off					
5 or less	3	2	5	7	12
Over 5 but not more than 7	3	1	4	0	4
Over 7	1	4	5	0	5
Average number of trees planted per day					
Less than 400	1	1	2	1	3
400 - 500	4	1	5	5	10
Over 500	2	5	7	1	8

TABLE  
RESULTS OF PERSONAL BREATHING ZONE AIR SAMPLES COLLECTED DURING TREE PLANTING OPERATIONS  
THIRAM STUDY, REFORESTATION, PACIFIC NORTHWEST

COMPANY IDENTIFICATION NUMBER	TYPE OF TREES PLANTED	TREE TREATMENT	NUMBER POSITIVE* NEGATIVE FOR THIRAM DETECTION		THIRAM CONCENTRATION mg/m <sup>3</sup>	TOTAL NUMBER SAMPLES
3	Bare Root	"Snow" **	0	10	10 < 0.02	10
	Bare Root	Thiram	4	6	0.029 0.028 0.030 0.157 6 < 0.02	10
4	Bare Root	"Snow"	0	9	9 < 0.01	9
	Bare Root	Thiram	3	14	0.021 0.021 0.018 14 < 0.02	17
5	Bare Root	Thiram	1	5	0.021 5 < 0.02	6
6	Bare Root	Thiram	0	3	3 < 0.02	3
	Plugs	Thiram	5	10	0.012 0.020 0.021 0.011 0.019 10 < 0.02	15
7	Bare Root	None (no Thiram or Snow)	0	7	7 < 0.02	7

\* Minimum detectable amount of Thiram was 5.0 micrograms per filter.

\*\* Snow - a substance similar in appearance to Thiram.

TABLE VIII C

SYMPTOMATOLOGY BY EXPOSURE GROUP - TREE PLANTERS  
 THIRAM STUDY, THE HOEDADS COOPERATIVE, INC., EUGENE OREGON  
 HHE 75-137 March 11 - April 7, 1976

## Symptoms Developing Over the Study Period

SYMPTOMS	THIRAM FREE TREES	
	TOTAL	PERCENT
Number of Workers	9	
Eye Complaints	3	33
Nasal Irritation	4	44
Throat Irritation	1	11
Chest Discomfort or Shortness of Breath	3	33
Cough	2	22
Skin Problems	1	11
Total with Local Symptoms Likely To Be Due in the Planters Planting Thiram Trees	7	78
Headaches	1	11
Dizziness or Lightheadedness	1	11
Fatigue	0	0
Nausea or Upset Stomach	2	22
Diarrhea	0	0
Alcohol Intolerance	0 of 7	
Total with Systemic Symptoms Likely To Be Due to Thiram in the Planters Planting Thiram Trees	3	33
Kidney Complaints	1	11
Total With No Complaints	2	22



TABLE IX C

SYMPTOMATOLOGY BY EXPOSURE GROUP - TREE PLANTERS  
 THIRAM STUDY, THE HOEDADS COOPERATIVE, INC., EUGENE, OREGON  
 HHE 75-137 March 11 - April 7, 1976

## Symptoms by History, Planters With Past Experience With Thiram

SYMPTOMS	COMPLETE QUESTIONNAIRE		ABBREVIATED	TOTAL	PERCENT
		PERCENT	QUESTIONNAIRE		
Number of Workers	7		7	14	
Self Health Assessment					
Good	7	100	6	13	93
Fair	0		1	1	7
Eye Complaints	0	0	0	0	0
Nasal Irritation	0	0	0	0	0
Throat Irritation	0	0	0	0	0
Cough	0	0	0	0	0
Chest Discomfort or Shortness of Breath	0	0	0	0	0
Skin Problems	5	71	1	6	43
Total With Local Symptoms Likely to be Due to Thiram	5	71	1	6	43
Jaches	3	43	1	4	29
Dizziness or Lightheadedness	1(1)*	14	0	1(1)*	7
Fatigue	3	43	1	4	29
Increased Problem with Pro- longed Work Week	1	14	2	3	21
Nausea or Upset Stomach	2	29	2	4	29
Diarrhea	2	29	2	4	29
Loss of Balance	0	0	1	1	7
Depression	0	0	1	1	7
Irritability	0	0	1	1	7
Alcohol Intolerance	2(1) of 4	29	1 of 5	3(1) of 9	33
Total with Systemic Symptoms Likely to be due to Thiram	5(1)	71	5	10(1)	71
Problems with Menstrual Periods	0	0 of 1	1	1	50(n=2)#
Total problems with menstrual periods & other problems probably or definitely not related to Thiram	1	14	1	2	14
Total with no Health Complaints	0	0	2	2	14

\*Nature of the problem was insufficiently clear to definitely categorize it. These are not included in the percentages. Workers with the questionable complaints were added from the "No health complaint" group.

#Of 4 female planters with no experience with thiram, one reported problems with her menstrual periods since she started planting. The 7 planters with no experience with thiram all considered their health to be good.