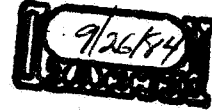


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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460



OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

September 26, 1984

MEMORANDUM

**SUBJECT:** Supplemental Information for Captan Exposure  
Analysis

**FROM:** E. Neil Pelletier, Ph.D.  
Plant Pathologist  
Science Support Branch  
Benefits and Use Division (TS-768-C)

**TO:** Harold R. Day, Chemist  
ECRS-II  
Exposure Assessment Branch  
Hazard Evaluation Branch (TS-769-C)

As agreed in the captan team meeting of September 24, the following information is submitted as an input into the exposure analysis for captan. The information includes application rates, maximum number of applications, and general methods of application for all captan use sites. Also included is a description of use practices and exposure periods associated with captan's use as a pineapple seed piece treatment.

Attachments

cc: Jeff Kempter, SRB  
Registration Division (TS-767-C)

A handwritten signature in cursive script that reads "E. Neil Pelletier".

## SUPPLEMENTAL INFORMATION FOR CAPTAN EXPOSURE ANALYSIS

Rates, Numbers, and Methods of Application for All Use Sites

The following lists present the method of application, the use rates, and numbers of application for all crop sites for which captan is registered. Those use sites on which a substantial amount of acreage is treated by means of air blast equipment is indicated with an asterisk in the application methods column. It should be noted that it has been determined via the captan RPAR assessment team reports that the extent of captan use on the following crops is negligible due to the availability of more efficacious fungicides: pineapples, beets, carrots, celery, eggplants, lettuce, peppers, potatoes, spinach, sweet corn, and tomatoes.

Rates, Numbers, and Methods of Application1. Foliage Use sites by Conventional Ground Sprayers or Dusters<sup>1/</sup>a. Fruit and Nut Crops

APPLIED IN WATER	AS DUST	CROP TREATED	MAX NO. APPL.	RATE RANGE LB. AI.	
				PER 100 GAL.	PER ACRE
X*	X	almonds	4	1.0	3.0-4.0
X*	X	apples	10	1.0	2.0-5.0
X*		apricots	4	1.0	3.0-4.0
X*		avacardo	4	1.0	
X	X	blackberries, raspberries	5	1.0	0.75-1.5
	X	blueberries	10	1.0	1.0
X*	X	cherries	10	1.0	1.0-5.0
X*		citrus	2	1.0	
X		cranberries	3	1.0	
X*	X	grapes	6	1.0	1.0-2.0
X*	X	mangoes	12	1.0	5.0-7.0
X*	X	nectrines, peaches	5	1.0	5.0
X*	X	pears	4	1.0	2.0-3.0
X*	X	plums, prunes	7	1.0	2.0-5.0
X*	X	strawberries	10	1.5	3.0
X		pineapples	8	5.0	5.0

b. Vegetable Crops

X*	X	beans	8	0.5	2.0-3.0
X		beets	7	1.0	
X	X	carrots	8	1.0	2.2-3.0
X	X	celery	13	1.0	3.2-6.5
X	X	cucurbits	13	1.5	1.1-3.8
X*		eggplant	14	1.0	
X	X	lettuce	8	1.0	2.5
X*		peppers	20	1.5	
X*	X	potatoes	17	2.0-4.0	3.0-6.0
X		rhubarb <sup>2/</sup>	10	1.0	
X		spinach	4	1.0	
X*		sweet corn	10	0.75	
X*	X	tomatoes	13	2.0	2.0-5.0

<u>APPLIED</u> <u>IN WATER</u>	<u>AS DUST</u>	<u>CROP</u> <u>TREATED</u>	<u>MAX NO.</u> <u>APPL.</u>	<u>RATE RANGE LB. AI.</u> <u>PER 100 GAL. PER ACRE</u>	
c. <u>Ornamental Crops</u>					
X		azaleas	4	1.0	
X	X	begonias	12	0.11-0.22	
X		carnations	20	1.0	
X		chrysanthemums	20	1.0	
X		dichonda <sup>3/</sup>	3	1.0	
X	X	turf	20	1.0 <sup>4/</sup>	1.0-2.0 <sup>4/</sup>
X*	X	roses	20	1.0	2.2-3.0
	X	misc. flowers	15		2.1-5.0

1/ Includes some greenhouse, houseplant, and home-garden-lawn uses. Rates according to registered label directions.

2/ Greenhouse use only

3/ California only

4/ Per 100,000 square feet

\* Indicates sites for which a substantial amount of acreage is treated by means of airblast equipment.

2. Fruit and Vegetable Post-Treated Sites in Commercial Operation  
by Sprayers or Dip Tanks.

<u>Applied In Water</u>	<u>As dust</u>	<u>Crops treated</u>	<u>Max No. Appl.</u>	<u>Rate range lb/100 gal</u>
x		Apples, apricots, pears	1	1.0-1.2
x		cherries, citrus	1	1.0-1.2
x		mangoes	1	1.2
x		nectarines, peaches	1	1.0-1.2
x		pineapples	1	5.0
x		cantaloupes, cucumbers	1	1.2
x		onions, <sup>1/</sup> potatoes	1	1.2
	x	raisins <sup>1/</sup>	2	1.0-1.5

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<sup>1/</sup> Rate, lb per acre of drying trays.

## 3. Seed Treatment Sites by Commercial or Farm Seed Treatment Equipment.

<u>Crop</u>	<u>Pounds of seed planting an acre</u>	<u>Rate range oz AI/100 lb seed</u>		
		<u>Slurry</u>	<u>Dry</u>	<u>Planter Box</u>
alfalfa	10	2.2-4.1	6.0	0.4
barley, oats	82	0.6-2.8	0.6-0.3	0.4-2.0
beans	51	0.8-1.5	1.5-2.0	0.2-1.0
beets	9	3.4-6.0	9.0	
crucifer <sup>1/</sup>	2	0.4-2.2	1.2-1.8	0.4
cucurbits <sup>2/</sup>	2	0.7-1.6	1.5-2.2	0.8
carrots	3	4.5	6.7	
clover	9	2.2-4.1	6.0	0.4
conifer			1.5	
corn (field)	13.4	0.5-1.2	0.8-1.7	1.6-1.8
corn (sweet)	13.4	0.8-2.0	1.5-1.9	
cotton	26	0.8-4.0	1.1-2.7	4.0-5.0
eggplant	2	3.0	4.5	
flax	-	1.0-2.0	1.5-3.0	
grasses	16	2.2-4.2	6.0	
kale	4	0.4		
peanuts	137	3.0	1.0-6.0	1.0-3.0
peas	163	0.8-1.8	1.8-2.0	0.8-1.0
peppers	3	0.8-1.5	2.2	
pumpkin, squash	3	0.5-1.8	0.8	
radish	11	0.75	1.1	
rice	137	1.0-3.8	0.8-3.8	2.0-3.5
rye	90	0.6-1.6	0.6-1.5	
safflower	-	1.94	0.3	
sorghum	7	0.8-2.3	1.0-3.0	0.5-2.0
soybeans	66	0.7-1.3	0.8-2.0	1.0-2.0
spinach	12	1.8-3.0	4.5	
sugar beets	10	0.6-9.6	0.6-9.0	
tomato	1	0.8		
turnips	1.5	0.4-1.5	2.2	
wheat	7	0.6-2.0	0.6-1.5	0.4-2.0

<sup>1/</sup> Crucifers includes broccoli, brussel sprouts, cabbage, cauliflower, collards, and mustard

<sup>2/</sup> Cucurbits include cucumbers, cantaloupe, and melons

4. Planting Stock Treatment Sites by Preplant Dip Tank or Dust Applicator.

<u>Crop</u>	<u>Rate</u>	
	<u>lb/100 gal</u>	<u>oz/bu</u>
asparagus	1.5	
pineapple	5.0	
potatoes <sup>1/</sup>	0.5-1.5	0.75-1.44
begonias, carnations	2.0	
chrysanthemums	2.0	
gladiolus	2.0-8.0	
peaches	2.0	

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<sup>1/</sup> Potatoes planted at rate of 300-3000 lbs/acre



## 5. Soil Treatment Prior to or at Planting.

<u>Placement</u>	<u>Applied as</u>	<u>Crop</u>	<u>Max. No. Appl.</u>	<u>Rate range lb/A</u>
Broadcast (by surface sprayer or duster)	dust	beans	1	3.5-6.0
	"	beets	1	3.3
	W.S. <u>1/</u>	beets	1	6.5
	"	crucifers	1	7.5
	"	cucurbits	1	6.0
	"	celery	1	4.5
	dust	celery	1	3.2-6.5
	"	corn	1	6.0
	"	eggplant	2	5.0-6.0
	"	peas	1	3.5-6.0
	W.S.	pepper	2	5.0-6.0
	W.S.	spinach	1	2.0-6.0
	dust	spinach	1	2.0-6.0
	"	tomato	1	5.0-7.5
	"	soybeans	1	2.0-6.0
	Band (by band sprayer or duster)	dust	cotton	1
dust		beans	1	2,5-3.0
"		onions	1	1.1-2.0
"		peas	1	3.0
"		spinach	1	2.5-3.0

6. Soil Surface Treatment for Established Plants by Ground Sprayers or Duster.

<u>Crop</u>	<u>Applied as</u>	<u>Max No. Appl.</u>	<u>Rate range lb</u>
azaleas, camellias	W.S.	2	0.5-1.0/1000 sq. ft.
dichondra	W.S.	2	1.0/1000 sq. ft.
ornamentals	W.S.	1	0.15/1000 sq. ft.
turf	W.S.	18	0.1/1000 sq. ft.
turf	dust	18	0.1-0.2/1000 sq. ft.
pineapples	W.S.	26	2.0/A

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1/ Water suspension from W.P.

## 7. Miscellaneous Uses.

<u>Site</u>	<u>Applied as</u>	<u>Rate range</u>
packing boxes	dip	1.0/100 gal
greenhouse soil	dust	0.125-0.2/1000 sq. ft.
home and garden	dust, WS	equivalent to field use
paints (oil base)	add to paint	1.0 oz/gal. paint
surface	low pressure bomb	0.0375% in 24.9% alcohol
cosmetics	additive	0.1-0.5%/wt.
lacquer, oil base paint	additive	0.52-2.1%/wt. of paint
laquer	additive	0.87-2.7%/wt. of solids
paint (oil base)	additive	0.15-2.7%/wt. solids or 0.36-0.9% wt. finished paint
paper		0.15-0.90%/wt. of paper
paste (wallpaper)	additive	0.335%/wt. of paste
plasticizer	additive	0.44-2.6%/wt. of plasticizer
polyethylene	additive	0.44-1.74%/wt. of stabilizer
rubber stabilizer	additive	" " " " "
textiles	additive	0.9-1.7%/wt. of fabric
vinyl resins	additive	0.44-2.0%/wt. of resins

### Aerial Application

In general, aerial applications to the following crops are made only under special circumstances such as when soils are too wet to permit heavy ground equipment to be used or when extended periods of rain occur during critical disease infections times and spray schedules can not be maintained by means of ground equipment: almonds, apples, apricots, cherries, citrus, peaches, pears.

### Use Practices for Pineapple Seedpiece Treatment

Captan is registered for use as a dip treatment for pineapple seedpieces prior to planting. The fungicide protects the seedpiece from root and stem rot caused by a soil-borne fungus. The treatment rate is 50 pounds ai per 1,000 gallons of water, enough to treat seedpieces planted to 2.5 acre. Seedpieces are suckers gathered from the base of established plants or crowns from harvested fruit. These seedpieces are planted on a three year cycle; two crops are harvested, one about 18 months after treatment and planting, and the second about 36 months after planting.

The treatment process involves opening 50 pound containers of an 50 percent wettable powder formulation and pouring the contents into 800 to 1,000 gallon capacity dip tanks which are half full of water. The suspension is mechanically agitated and water is added to fill the tank to capacity. The dip tank is described as a closed system. Seed pieces are feed into the tank and are mechanically run through the suspension. The seedpieces are conveyed to and from the dip tanks by means of a belt system. The treated seedpieces are transported to and dumped into the field where they are available for planting for the planting day.

Other practices in the treatment process include monitoring the treatment equipment and cleaning and rinsing the dip tanks. The treatment process involves two workers, one as mixer/loader and the second as monitor of the process and cleaner of the dip tanks. The process may be carried out at all seasons of the year. Treatment sites number about 15, these sites are distributed among 4 to 5 plantations.

Exposure potential may also extend to the planting operation, since treated seedpieces are planted by hand. One source of informaiton on the planting operation states that the treated seedpieces are air dried before planting, a second source indicates that the treated seedpieces are merely dumped at the planting site; therefore, all seedpieces may not necessarily be dry in regard to surface residue. It is estimated that a worker is able to plant from 0.25 to 0.3 acres of seedpieces per day and planting is carried out about 120 days throughout the year. Labels make no suggestions regarding use of protective clothing or equipment. Workers involved in the planting operation may or may not wear cotton gloves. Use data as persented below and in Table 1 are based on the Exposure Analysis supplied by Rhone-

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Poulenc for a proposed registration for pineapple seedpiece treatment compound and on personal communications with a representative of the company and a pineapple producing company.

Data are provided for a situation, that assumes all of the Hawaiian production to be treated with captan. Also, since there is a transition from seasonal planting of pineapples to planting throughout the year, the data are based on the latter situation.

Over a period of a year, the total potential exposure time for the mixer, monitor, and planter was calculated to be 13.2, 6.0 and 960 hours, respectively. For the situation in which all of the Hawaiian production would be treated, 15, 15 and 375 workers would be potentially exposed, respectively.

CAPTAN USE DATA RELATIVE TO EXPOSURE

Table 1. Pineapples/Pre-Plant Treatment - Usage On All Hawaiian Acreage

PERCENT OF CROP, SEASON, EQUIPMENT	APPLICATION		ACRES		NUMBER OF WORKERS INVOLVED			TOTAL NUMBER OF HOURS <sup>3/</sup> FOR TREATMENT YEAR			
	Formulation and Rate AI	Number	Interval	Total Treated	Ave. Site	Mixer <sup>1/</sup>	Monitor <sup>2/</sup>	Planter	Mixer	Monitor	Planter
100% Year around. Dip tanks.	50 WP 50 lb/1000 gallons	1	0	14,670	980	15	15	375	13.2	60	960

1/ Worker loads dip tank and supervises operation.

2/ Worker monitors process and cleans tanks.

3/ Over a one year period (120 planting days), total exposure for individual worker.