

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



OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

MEMORANDUM

DATE: March 30, 2022

SUBJECT: **Captan.** Review of Risk Estimates from Proposed Mitigation Measures for Select Crops.

PC Code: 081301

Decision No.: 582565

Petition No.: N/A

Risk Assessment Type: Single Chemical/Aggregate

TXR No.: N/A

MRID No.: N/A

DP Barcode: D464961

Registration Nos.: N/A

Regulatory Action: Registration Review

Case No.: 0120

CAS No.: 133-06-2

40 CFR: §180.314

FROM: Briana Lee, M.S., Biologist *Briana Lee*
Risk Assessment Branch III (RAB3)
Health Effects Division (HED, 7509T)

THROUGH: Laura Bacon, Biologist
Thomas Moriarty, Branch Chief
Risk Assessment Branch III
Health Effects Division (7509T)

Handwritten signatures of Laura Bacon and Thomas Moriarty.

TO: Christina Scheltema, Chemical Review Manager
Marianne Mannix, Team Leader
Kelly Sherman, Branch Chief
Risk Management and Implementation Branch III (RMIB III)
Pesticide Re-evaluation Division (PRD; 7508M)

The Pesticide Re-evaluation Division (PRD) of the Office of Pesticide Programs (OPP) has requested that the Health Effects Division (HED) conduct additional exposure and risk assessments to assist in the mitigation process for the active ingredient (ai), captan. This memorandum serves to contribute to HED's 2018 registration review human health draft risk assessment (DRA), the first 2021 addendum to the 2018 DRA (referred herein as the first addendum), and the second 2021 addendum to the 2018 DRA (referred herein as the second addendum), and occupational and residential exposure (ORE) for registration review (L. Bacon *et al.*, D438849, 09/26/2018; B. Lee, *et al.*, D453333, 03/02/2021; B. Lee, *et al.*, D463917, 11/03/2021; S. Tadayon, D447725, 08/09/2018). This document, which supports the ongoing captan registration review, incorporates proposed reduced application rates, as well as amount handled and/or area treated limitations on specific crops selected by PRD.

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1.0 Executive Summary

The ai, captan [3a,4,7,7a-tetrahydro-2-[(trichloromethyl)thio]-1*H*-isoindole-1,3(2*H*)-dione], is a broad-spectrum fungicide with protectant and some curative activity that belongs to fungicide resistance group M4 according to the Fungicide Resistance Action Committee (FRAC, 2012). Captan metabolizes and degrades in the environment rapidly, primarily into tetrahydrophthalimide (THPI) and thiophosgene through cleavage of the sulfonamide bond. THPI is further metabolized into other minor compounds or degraded in the environment into the major compounds tetrahydrophthalimic acid (THPAm), tetrahydrophthalic acid (THAPI), and *cis*-6-cyano-3-cyclohexenecarboxylic acid (THCY), as well as numerous other minor residues (L. Bacon, *et al.*, D438849, 09/26/2018).

For a detailed summary of the use and exposure profiles, hazard characterization and dose response, non-occupational spray drift, non-occupational post-application inhalation assessment, cumulative risks, and occupational risk assessment, refer to the 2018 DRA, first addendum, and second addendum (L. Bacon, *et al.*, D438849, 09/26/2018; B. Lee, *et al.*, D453333, 03/02/2021; B. Lee, *et al.*, D463917, 11/03/2021).

This memorandum, which supports the ongoing captan registration review, incorporates proposed reduced application rates, as well as proposed acreage and amount handled limitations on various crops (Table 1.1).

Table 1.1. Overview of PRD proposed reduced rates, proposed amount handled limitations, and proposed area treated limitations by crop for assessment.				
Crop	Current Maximum Application Rate	Proposed Reduced Rate	Mechanically-Pressurized Handgun Amount Handled Limitation (gallons)	Airblast Applicator Area Treated Limitation (acres)
Apple, Peaches, Nectarines	4.00 lb ai/A	3.00 lb ai/A	245 (at max rate) 325 (at reduced rate)	30 (at reduced rate)
Cherries	3.16 lb ai/A	2.05 lb ai/A	315 (at max rate) 325 (at reduced rate)	30 (at reduced rate)
Grapes, Juice & Grapes, Table	2.04 lb ai/A	1.75 lb ai/A	485 (at max rate) 570 (at reduced rate)	No reduction necessary
Almonds	4.50 lb ai/A	No proposed change	220 (at max rate)	20 (at max rate)
Blueberries	2.50 lb ai/A	No proposed change	395 (at max rate)	36 (at max rate)
Apricots	2.50 lb ai/A	No proposed change	395 (at max rate)	Not considered
Plums/Prunes	3.00 lb ai/A	No proposed change	325 (at max rate)	Not considered
Ornamentals	0.0123 lb ai/gal	No proposed change	78 (at max rate)	Not considered

2.0 Occupational Handler Dermal and Inhalation Risk Estimates Incorporating Reduced Application Rates and Area Treated/Amount Handled Limitations

PRD has requested that HED conduct an additional occupational risk assessment for proposed reductions in application rates and/or for limitations to amount handled (gallons/day) for a

specific subset of registered uses for captan, including apples, peaches, nectarines, cherries, grapes, almonds, plums/prunes, apricots, blueberries, and ornamentals. The revised dermal and inhalation margins of exposure (MOEs) are presented in Table 2.1. These proposed reductions and limitations are specifically for airblast, groundboom, and mechanically pressurized handgun scenarios for dry flowable (DF), liquid, and wettable powder (WP) formulations. For aerial scenarios, PRD has requested values for the liquid formulation only. The proposed reduced application rates were informed by analyses conducted by the Biological and Economic Analysis Division (BEAD) and PRD (C. Chen, *et al.*, “*Captan Usage, Pest Management Benefits and Impacts of Proposed Mitigation for Use on Pome Fruit (PC# 081301)*”, 03/23/2022; R. Waterworth, *et al.*, “*Assessment of Usage, Benefits and Impacts of Potential Mitigation in Stone Fruit Production for the Fungicide Captan (PC#081301)*”, 03/18/2022; J. Hansel, *et al.*, “*Caneberry, Blueberry, and Grape Captan Benefits and Impacts of Potential Mitigation (PC# 081301)*”, 03/23/2022). Risk estimates continue to be provided with standard HED exposure assumptions assuming the current registered maximum application rates for these registered uses (shaded in light grey); for more information about use patterns and maximum application rates refer to Table E.1. in the first addendum (B. Lee, *et al.*, D453333, 03/02/2021). The unshaded values provided in Table 2.1 only reflect these proposed mitigations which are not reflective of current labels and are dependent upon approved revisions of all applicable captan end-use products.

The following standard assumptions and exposure factors were utilized to complete the assessments:

Unit Exposures: It is the policy of HED to use the best available data to assess handler exposure. Sources of generic handler data, used as surrogate data in the absence of chemical-specific data, include PHED 1.1, the AHETF database, the Outdoor Residential Exposure Task Force (ORETF) database, or other registrant-submitted occupational exposure studies. Some of these data are proprietary (e.g., AHETF data), and subject to the data protection provisions of FIFRA. The standard values recommended for use in predicting handler exposure that are used in this assessment, known as “unit exposures”, are outlined in the “Occupational Pesticide Handler Unit Exposure Surrogate Reference Table¹”, which, along with additional information on HED policy on use of surrogate data, including descriptions of the various sources, can be found at the Agency website².

Personal Protective Equipment: Captan product labels direct mixers, loaders, applicators, and other handlers to wear baseline attire (i.e., long-sleeved shirt, long pants, shoes and socks) and generally require additional PPE consisting of coveralls, chemical resistant apron, chemical resistant gloves, protective eyewear, and/or a respirator.

Estimates of dermal and inhalation exposure were calculated for various levels of PPE. Results are presented for baseline (i.e., single layer of clothing consisting of a long-sleeved shirt, long pants, shoes plus socks) with various levels of PPE as necessary (e.g., gloves, double layer and

¹ Available: <https://www.epa.gov/sites/default/files/2021-05/documents/occupational-pesticide-handler-unit-exposure-surrogate-reference-table-may-2021.pdf>

² Available: <https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/occupational-pesticide-handler-exposure-data>

respirators, etc.).

Estimates of inhalation exposure and risk for occupational handler exposure assessments consider the reduction in exposure afforded by respirators. Results are presented half-face filtering facepiece or elastomeric respirators, quantified via application of their corresponding assigned protection factor (PF) of 10 (90% exposure reduction), and also for a PF of 50 (98% exposure reduction). This format, in some cases along with risk estimates for engineering controls, provides a variety of options for risk management decisions.

Standard Area Treated or Amount Handled: The inputs for area treated and amount handled were based on information from ExpoSAC Policy 9.2. with area treated or amount handled per day as follows (for proposed non-standard area treated or amount handled, see Table 1.1):

- Aerial
 - 350 acres for orchard/vineyard
- Airblast
 - 40 acres for orchard/vineyard
- Groundboom
 - 40 acres for orchard/vineyard
- Flagger (aerial)
 - 350 acres for orchard/vineyard
- Mechanically-pressurized handgun
 - 1,000 gallons solution for orchard/vineyard
 - 175 gallons solution for ornamentals (greenhouse)
 - 300 gallons solution for ornamentals (nursery)

Table 2.1. Occupational Handler Exposures and Risk Estimates with Proposed Reduced Application Rates										
Crop	Amount Handled/ Area Treated ¹	Application Rate ²	Formulation ³	Dermal MOEs ⁴ (LOC = 100)			Inhalation MOEs ⁴ (LOC = 30)			
				SL/G	DL/G	EC/No G ⁵	PF10 R	PF50 R	EC/No R ⁶	
Apples, Peaches, Nectarines	40 acres (standard assumptions)	4.00 lb ai/A	DF	4,000	5,100	3,300	8.9	45	3.1	
		Airblast and Groundboom (M/L)	Liquid	5,500	7,100	6,900	370	1,800	730	
			WP	3,600	6,300	3,300	29	150	3.1	
		Airblast Applicator	Spray	130	140	14,000 (EC/G)	17	85	120	
		Groundboom Applicator	Spray	13,000	16,000	41,000 (EC/G)	240	1,200	400	
	40 acres	3.00 lb ai/A (reduced rate)	DF	5,400	6,800	4,300	12	59	4.1	
		Airblast and Groundboom (M/L)	Liquid	7,400	9,500	9,100	490	2,400	970	
			WP	4,800	8,400	4,300	39	190	4.1	
		Airblast Applicator	Spray	170	190	19,000 (EC/G)	23	110	160	
		Groundboom Applicator	Spray	17,000	22,000	54,000 (EC/G)	310	1,600	530	
	1,000 gallons Solution (standard assumptions)	0.20 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	81	120	ND	7.3	37	ND
	245 gallons Solution (amount handled limit)	0.20 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	500	ND	30	150	ND
	325 gallons solution (amount handled limit + reduced rate)	0.150 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	500	ND	30	150	ND

Table 2.1. Occupational Handler Exposures and Risk Estimates with Proposed Reduced Application Rates										
Crop	Amount Handled/ Area Treated ¹	Application Rate ²	Formulation ³	Dermal MOEs ⁴ (LOC = 100)			Inhalation MOEs ⁴ (LOC = 30)			
				SL/G	DL/G	EC/No G ⁵	PF10 R	PF50 R	EC/No R ⁶	
	350 acres	4.00 lb ai/A	Liquid only	630	820	780	42	210	83	
		Aerial (M/L)								
		Aerial Applicator	Spray	ND	ND	11,000 (EC/G)	ND	ND	190	
		Aerial Flagger	Spray	2,000	2,300	ND	45	230	ND	
		3.00 lb ai/A	Liquid only	840	1,100	1,000	56	280	110	
		Aerial (M/L)								
Aerial Applicator	Spray	ND	ND	15,000 (EC/G)	ND	ND	250			
Aerial Flagger	Spray	2,600	3,000	ND	60	300	ND			
Cherries	40 acres	3.16 lb ai/A	DF	5,100	6,400	4,100	11	56	3.9	
		Airblast and Groundboom (M/L)	Liquid	7,000	9,100	8,700	460	2,300	920	
			WP	4,600	8,000	4,100	37	180	3.9	
			Airblast Applicator	Spray	170	180	18,000 (EC/G)	22	110	150
		Groundboom Applicator	Spray	16,000	21,000	52,000 (EC/G)	300	1500	510	
	40 acres	3.00 lb ai/A	DF	5,400	6,800	4,300	12	59	4.1	
		Airblast and Groundboom (M/L)	Liquid	7,400	9,500	9,100	490	2,400	970	
			WP	4,800	8,400	4,300	39	190	4.1	
			Airblast Applicator	Spray	170	190	19,000 (EC/G)	23	110	160
		Groundboom Applicator	Spray	17,000	22,000	54,000 (EC/G)	310	1,600	530	
	1,000 gallons Solution (standard assumptions)	0.158 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	100	160	ND	9.4	47	ND
	315 gallons	0.158 lb ai/gal	DF/ Liquid/		330	490	ND	30	150	ND

Table 2.1. Occupational Handler Exposures and Risk Estimates with Proposed Reduced Application Rates										
Crop	Amount Handled/ Area Treated ¹	Application Rate ²	Formulation ³	Dermal MOEs ⁴ (LOC = 100)			Inhalation MOEs ⁴ (LOC = 30)			
				SL/G	DL/G	EC/No G ⁵	PF10 R	PF50 R	EC/No R ⁶	
	Solution (standard assumptions)	Mechanically Pressurized Handgun (M/L/A)	WP							
	325 gallons solution (amount handled limit + reduced rate)	0.150 lb ai/gal Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	500	ND	30	150	ND	
	350 acres	3.16 lb ai/A Aerial (M/L)	Liquid only		800	1,000	990	53	260	100
		Aerial Applicator	Spray		ND	ND	14,000 (EC/G)	ND	ND	240
		Aerial Flagger	Spray		2,500	2,800	ND	57	290	ND
		3.00 lb ai/A Aerial (M/L)	Liquid only		840	1,100	1,000	56	280	110
		Aerial Applicator	Spray		ND	ND	15,000 (EC/G)	ND	ND	250
		Aerial Flagger	Spray		2,600	3,000	ND	60	300	ND
	Grapes	40 acres	2.04 lb ai/A	DF	7,900	9,900	6,400	18	87	6
			Airblast and Groundboom (M/L)	Liquid	11,000	14,000	13,000	710	3,600	1,400
WP				7,100	12,000	6,400	57	290	6	
Airblast Applicator			Spray	260	280	28,000 (EC/G)	33	170	230	
Groundboom Applicator			Spray	25,000	32,000	80,000 (EC/G)	460	2,300	780	
40 acres		Airblast and Groundboom (M/L)	1.75 lb ai/A	DF	9,300	12,000	7,400	20	100	7
			Liquid	13,000	16,000	16,000	840	4,200	1,700	
			WP	8,300	14,000	7,400	66	330	7	

Table 2.1. Occupational Handler Exposures and Risk Estimates with Proposed Reduced Application Rates

Crop	Amount Handled/ Area Treated ¹	Application Rate ²	Formulation ³	Dermal MOEs ⁴ (LOC = 100)			Inhalation MOEs ⁴ (LOC = 30)										
				SL/G	DL/G	EC/No G ⁵	PF10 R	PF50 R	EC/No R ⁶								
		Airblast Applicator	Spray	300	320	33,000 (EC/G)	39	190	270								
		Groundboom Applicator	Spray	29,000	38,000	93,000 (EC/G)	540	2,700	910								
	1,000 gallons Solution (standard assumptions)	0.102 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	160	240	ND	14	72	ND							
		0.102 lb ai/gal															
	485 gallons Solution (amount handled limit)	0.102 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	300	450	ND	30	150	ND							
		0.0875 lb ai/gal															
	570 gallons solution (amount handled limit + reduced rate)	0.0875 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	490	ND	30	150	ND							
		2.04 lb ai/A															
	350 acres	Aerial (M/L)	Liquid only		1,200	1,600	1,500	82	410	160							
		Aerial Applicator									Spray	ND	ND	22,000 (EC/G)	ND	ND	370
		Aerial Flagger									Spray	3,900	4,400	ND	89	440	ND
		1.75 lb ai/A									Liquid only	1,400	1,900	1,800	95	480	190
Aerial (M/L)																	
Aerial Applicator		Spray									ND	ND	26,000 (EC/G)	ND	ND	430	
Aerial Flagger	Spray	4,500	5,100	ND	100	520	ND										
Almonds	40 acres (standard assumptions)	4.50 lb ai/A	DF	3,600	4,500	2,900	8	40	2.7								
			Liquid	4,900	6,300	6,100	320	1,600	650								

Table 2.1. Occupational Handler Exposures and Risk Estimates with Proposed Reduced Application Rates										
Crop	Amount Handled/ Area Treated ¹	Application Rate ²	Formulation ³	Dermal MOEs ⁴ (LOC = 100)			Inhalation MOEs ⁴ (LOC = 30)			
				SL/G	DL/G	EC/No G ⁵	PF10 R	PF50 R	EC/No R ⁶	
		Airblast and Groundboom (M/L)	WP	3,200	5,700	2,900	26	130	2.7	
		Airblast Applicator	Spray	120	130	13,000 (EC/G)	15	75	100	
		Groundboom Applicator	Spray	11,000	15,000	36,000 (EC/G)	210	1,000	360	
	1,000 gallons solution (standard assumptions)	0.225 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	72	110	ND	6.6	33	ND
	220 gallons solution (amount handled limit)	0.225 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	500	ND	30	150	ND
Plums/Prunes	1,000 gallons solution (standard assumptions)	0.15 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	110	160	ND	9.8	49	ND
	325 gallons solution (amount handled limit)	0.15 lb ai/gal	Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	500	ND	30	150	ND
Blueberries	40 acres (standard assumptions)	2.50 lb ai/A	DF	6,400	8,100	5,200	14	71	4.9	
		Airblast and Groundboom (M/L)	Liquid	8,900	11,000	11,000	580	2,900	1,200	
		Airblast and Groundboom (M/L)	WP	5,800	10,000	5,200	47	230	4.9	
		Airblast Applicator	Spray	210	230	23,000 (EC/G)	27	140	190	

Table 2.1. Occupational Handler Exposures and Risk Estimates with Proposed Reduced Application Rates										
Crop	Amount Handled/ Area Treated ¹	Application Rate ²	Formulation ³	Dermal MOEs ⁴ (LOC = 100)			Inhalation MOEs ⁴ (LOC = 30)			
				SL/G	DL/G	EC/No G ⁵	PF10 R	PF50 R	EC/No R ⁶	
		Groundboom Applicator	Spray	21,000	26,000	65,000 (EC/G)	380	1,900	640	
	1,000 gallons Solution (standard assumptions)	0.125 lb ai/gal Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	130	200	ND	12	59	ND	
	395 Gallons Solution (amount handled limit)	0.125 lb ai/gal Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	500	ND	30	150	ND	
Apricots	40 acres (standard assumptions)	2.50 lb ai/A	DF	6,400	8,100	5,200	14	71	4.9	
			Liquid	8,900	11,000	11,000	580	2,900	1,200	
			WP	5,800	10,000	5,200	47	230	4.9	
		Airblast and Groundboom (M/L)	Airblast Applicator	Spray	210	230	23,000 (EC/G)	27	140	190
		Groundboom Applicator	Spray	21,000	26,000	65,000	380	1,900	640	
	1,000 gallons Solution (standard assumptions)	0.125 lb ai/gal Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	130	200	ND	12	59	ND	
	395 Gallons Solution (amount handled limit)	0.125 lb ai/gal Mechanically Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	330	500	ND	30	150	ND	

Table 2.1. Occupational Handler Exposures and Risk Estimates with Proposed Reduced Application Rates									
Crop	Amount Handled/ Area Treated ¹	Application Rate ²	Formulation ³	Dermal MOEs ⁴ (LOC = 100)			Inhalation MOEs ⁴ (LOC = 30)		
				SL/G	DL/G	EC/No G ⁵	PF10 R	PF50 R	EC/No R ⁶
Ornamentals (Greenhouse)	175 gallons solution (standard assumption)	0.0123 lb ai/gal Mechanically-Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	4,300	5,200	ND	13	66	ND
	78 gallons solution (standard assumption)	0.0123 lb ai/gal Mechanically-Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	9,600	12,000	ND	30	150	ND
Ornamentals (Nursery)	300 gallons solution (standard assumption)	0.0123 lb ai/gal Mechanically-Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	2,500	3,000	ND	7.8	39	ND
	78 gallons solution (standard assumption)	0.0123 lb ai/gal Mechanically-Pressurized Handgun (M/L/A)	DF/ Liquid/ WP	9,600	12,000	ND	30	150	ND

Shaded in grey – scenarios conducted with standard assumptions and maximum application rates.

¹ Exposure Science Advisory Council Policy #9.2.

² Assessment based on maximum registered application rates for each crop (refer to Table E.1. from the 1st addendum (B. Lee, *et al.*, 03/02/2021, D453333)).

³ DF = Dry flowable; WP = wettable powder. Aerial applications have not been assessed for DF or WP per PRD's request, based on PRD's proposed mitigation to prohibit those use patterns.

⁴ EC/No G = Engineering controls (water soluble packets) without gloves. For aerial applicators, EC/G = engineering control (enclosed cockpits) with gloves; data are not available for enclosed cockpits without gloves for aerial applicators.

⁵ EC/No G = Engineering controls (enclosed cabs) without respirator.

Additionally, HED was requested to quantify the inhalation risk estimates specifically for airblast applicator scenarios for certain registered uses for captan (apples, peaches, nectarines, cherries, and grapes) with both reduced application rates and area treated limitations (Table 2.2) and select other crops (almonds and blueberries) with only area treated limitations (Table 2.3). Risk estimates which utilize the standard HED exposure assumptions (i.e., area treated) and the current registered maximum application rates for these registered uses are also provided for reference (shaded in light grey). The unshaded values provided in Table 2.2 and 2.3 only reflect these proposed mitigations which are not reflective of current labels and are dependent upon approved revisions of all applicable captan end-use products.

Table 2.2. Occupational Handler Exposure and Risk Estimates for Airblast Applicators with Reduced Application Rates and Area Treated Limitations for Select Crops				
Crop	Application Rates	Area Treated ³	Inhalation MOEs ⁴ (LOC = 30)	
			PF10-R	EC/No R
Apples, Peaches, Nectarines	4.00 lb ai/A ¹	40 acres	17	120
	3.00 lb ai/A ²	40 acres	23	160
		36 acres	25	170
		30 acres	30	210
Cherries	3.16 lb ai/A ¹	40 acres	22	150
	3.00 lb ai/A ²	40 acres	23	160
		36 acres	25	170
		30 acres	30	210
Grapes	2.04 lb ai/A ¹	40 acres	33	230
	1.75 lb ai/A ²	40 acres	39	270

¹ Current maximum single application rates based on registered labels; refer to Table E.1. (B. Lee, *et al.*, 03/02/2021, D453333) and proposed reduced rates.

² Proposed application rates informed by BEAD division.

³ The standard assumptions for orchard/vineyard area treated is 40 acres.

⁴ Inhalation MOE = Inhalation POD (mg/kg/day) ÷ Inhalation Dose (mg/kg/day).

Table 2.3. Occupational Handler Exposure and Risk Estimates for Airblast Applicators with Area Treated Limitations for Select Crops				
Crop	Application Rates ¹	Area Treated ²	Inhalation MOEs ³ (LOC = 30)	
			PF10-R	EC
Almonds	4.50 lb ai/A	40 acres	15	100
		24 acres	25	170
		20 acres	30	210
Blueberries	2.50 lb ai/A	40 acres	27	190
		36 acres	30	210

¹ Current maximum single application rates based on registered labels; refer to Table E.1. (B. Lee, *et al.*, 03/02/2021, D453333).

² The standard assumptions for orchard/vineyard area treated is 40 acres.

³ Inhalation MOE = Inhalation POD (mg/kg/day) ÷ Inhalation Dose (mg/kg/day).

3.0 Occupational Post-Application Dermal Risk Estimates with Reduced Application Rates

Lastly, HED was requested to quantify the occupational post-application dermal risk estimates that would result from proposed reduced application rates of captan for apples, peaches, cherries, grapes (wine, juice), and grapes (table). Table 3.1. provides the occupational post-application

dermal risk estimates and restricted-entry interval (REI) recommendations based on proposed reduced application rates. Risk estimates which utilize current registered maximum application rates for these registered uses are also provided for reference (shaded in light grey). The unshaded values provided in Table 3.1 only reflect these proposed mitigations which are not reflective of current labels and are dependent upon approved revisions of all applicable captan end-use products.

Crop	Worker Re-entry Activity	Current Maximum Application Rates	REI with MOE \geq LOC = 100	Proposed Reduced Application Rate	Reduced Application Rate REIs
Apples, Peaches, Nectarines	Hand thinning	4 lb ai/A	DAT6	3 lb ai/A	DAT0 = 100
Cherries	Hand thinning	3.16 lb ai/A	DAT1	2.05 lb ai/A	DAT0 = 160
Grapes, wine/juice	Tying, training, hand harvesting, leaf pulling	2.04 lb ai/A	DAT3	1.75 lb ai/A	DAT2 = 110 ²
Grapes, table	Girdling and turning	2.04 lb ai/A	DAT8	1.75 lb ai/A	DAT6 = 110 ³

¹ Current maximum single application rates based on registered labels; refer to Table E.1. (B. Lee, *et al.*, 03/02/2021, D453333).

² MOEs are 94 at DAT1 and 78 at DAT0.

³ MOEs are 96 at DAT5 and 82 at DAT4.

4.0 References

Author	Barcode	Date	Title
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J. Hansel, <i>et al.</i>		03/23/2022	Caneberry, Blueberry, and Grape Benefits and Impacts of Potential Mitigation (PC# 081301).
B. Lee, <i>et al.</i>	D463917	11/03/2021	Captan. Second Addendum to the Human Health Draft Risk Assessment in Support of Registration Review with Updated Occupational and Residential Exposure Assessment.
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