



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

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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

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MEMORANDUM

SUBJECT: PP#4E3146 (Acc. #264441): Permethrin (Ambush®) In Or On Avocados and Papayas. Amendment of 8/19/86 (RCB #1425).

FROM: W. T. Chin, Chemist
Tolerance Petition Section III
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

W. T. Chin

THRU: Philip V. Errico, Section Head
Tolerance Petition Section III
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

Philip V. Errico

TO: Hoyt L. Jamerson, PM #43
Minor Uses Officer
Registration Division (TS-767)

and

Toxicology Branch
Hazard Evaluation Division (TS-769)

In previous amendments of PP#4E3146 (6/21/85 and 1/27/86 memos of L. L. Kutney), RCB recommended against the proposed tolerance of 1.0 ppm for residues of the insecticide permethrin [(3-phenoxyphenyl)methyl 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate] and its metabolites 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid (DCVA) and (3-phenoxybenzyl)methanol (3-PBA) in or on the raw agricultural commodities avocados and papayas because of the deficiencies cited in L. L. Kutney's 11/23/84 review (PP#4E3146, Acc. #072887, L. L. Kutney).

In response to these deficiencies, the petitioner, Dr. George M. Markle (National coordinator, IR-4), submitted an amendment which included a cover letter (4/29/86) to H. L. Jamerson (EPA) and a revised Section B. RCB has reviewed that amendment and concluded that deficiency No. 1 remains outstanding, but deficiency No. 2 has been resolved (see W. T. Chin's 7/31/86 memo).

Prior to receiving RCB's 7/31/86 comments/conclusions, Dr. G. M. Markle submitted a second revision of Section B on 8/19/86.

The deficiency No.1 identified above is restated below in two parts, 1A and 1B, followed by the petitioner's response (the 8/19/86 revision of Section B) and RCB's comment/conclusion.

Deficiency 1A (Avocado Label) and 1B (Papaya Label)

The avocado label does not include the explanation as to how to determine the number of gallons per acre. The avocado label should be revised so that footnote 1/ reads:

"1/ Do not use more than 12.8 oz. Ambush®/A. The final spray should be no more concentrated than 12.8 oz./100 gallons. Since tree size and spacing will affect the amount of spray needed for dilute sprays, the applicator must know the number of gallons of water/A needed to spray the trees to the point of drip. If you do not know this gallonage, you should conduct a test to determine it. If you do not know how to conduct such a test with your equipment, you should ask for assistance from your equipment dealer. For dilute sprays (i.e. sprayed to the point of runoff) 12.8 oz Ambush® should be dilute with the gallonage determined by this test."

RCB requires this on the label because it is not clear whether the residue experiments on avocados involved sprays to the point of run-off, or were not sprayed to run-off but used the maximum proposed rate per acre. The label must clearly state that no more than 12.8 oz Ambush®/A may be applied.

The papaya label should also be revised for the same reasons as stated above for avocados.

The Petitioner's Response to Deficiency 1A and 1B

On the avocado label revised on 8/19/86, rates are specified: 12.8 oz. Ambush®/100 gallons/A/treatment for small trees and 12.8 oz. Ambush®/400 gallons/A/treatment for large trees. The footnote 1/ suggested above is also adequately added to the label.

The petitioner did not make any revision on the papaya label submitted on 8/19/86 as compared with the papaya label submitted previously on 4/29/86.

RCB's Comment/Conclusion on the Petitioner's Response to Deficiency 1A and 1B

Since the petitioner has not defined the dimension of the so-called "small" and "large" avocado trees, the users cannot estimate the gallons of water and the amount of active ingredient needed to spray one acre of avocado or papaya trees

and all between the "small" and "large" ones. After re-evaluating the limited residue data submitted for the proposed use and efficacy considerations permitting, RCB can recommend for this use if the label is changed to read as follows: "The product can only be used at the following rate: 0.2 lbs a.i./200 gal water and apply spray to run-off. No other rates are allowed for this orchard spray use on avocados and papayas." Spray intervals, number of applications per season, and grazing restrictions require no changes at this time.

RECOMMENDATION

For the reasons stated above, RCB continues to recommend against the establishment of the proposed tolerances for residues of the insecticide permethrin and its metabolites DCVA and 3-PBA in or on the raw agricultural commodities avocados and papayas at 1.0 ppm because of the deficiency 1A and 1B.

ADDITIONAL CONSIDERATIONS

As a guidance to any future orchard spray applications, the petitioner should incorporate one or more of the following concepts in their submissions as the means of instructing the users on how to vary the quantity of a.i./acre that is needed for different tree sizes.

Procedure 1. For High Volume (HV) Spray Applications to Orchards

Determine volume/A to spray orchard to run-off. Use so much active ingredient/100 gal and multiply this number by the volume/A to spray your orchard to run-off to determine the amount of active ingredient/A.

For Example:

Step 1: Use rate (determined by petitioner)..... 0.5 lb a.i./100 gal

Step 2: To spray one acre of your orchard to run-off..... 300 gal/A

Step 3: The amount of lb a.i./acre in 300 gal of water is 1.5 lb (0.5 lb a.i./100 gal x 300 gal/A).

Procedure 2. Estimation of Tree Row Volume (TRV) to Calculate the Gallons/Acre Needed to Spray to Run-off

Step 1: $43,560 / \text{between-row spacing (ft)} = \text{feet of row/acre.}$

Step 2: Feet of row/acre x tree height (ft) x cross-row limb spread (ft) = cu ft of TRV/acre.

Step 3: Select one of the following numbers that best indicates the canopy density of each separate orchard or block:

- 0.70 gal/1,000 cu ft: Trees extremely open, light visible through entire tree, less than 15 scaffold limbs/tree or young tree.
- 0.75 gal/1,000 cu ft: Trees very open, 18 - 21 scaffold limbs/tree, light penetration throughout tree, healthy spurs within tree canopy.
- 0.80 gal/1,000 cu ft: Trees well pruned, adequate light in trees for healthy spurs throughout trunk and scaffold limbs, many holes in foliage where light can be seen through tree.
- 0.85 gal/1,000 cu ft: Trees moderately well pruned, reasonable spur population within canopy, tree thick enough that light cannot be seen through bottom two-thirds of tree.
- 0.90 gal/1,000 cu ft: Trees pruned minimally, spurs inside canopy are weak due to limited light, very few holes where light can be seen through the tree.
- 0.95 gal/1,000 cu ft: Little or no pruning, spurs dead or very weak in canopy, very little light visible through tree.
- 1.00 gal/1,000 cu ft: Tree totally unpruned, extremely thick, no light visible anywhere through tree canopy, trees more than 20 ft high.

Step 4:
$$\frac{\text{cu ft of TRV/acre (from Step 2)} \times \text{density (from Step 3)}}{1,000} = \text{gal of dilute solution to be applied per acre}$$

Step 5: Using the volume of spray to run-off calculated in Step 4 above, calculate the lb a.i./acre using the formula of Procedure 1 (Step 3).

For Example: An orchard has rows spaced 25 ft apart, tree height is 20 ft, and cross row limb spread is 17 ft. The tree density is 0.85.

Step 1: $43,560 \text{ ft}^2 / 25 \text{ ft} = 1,742.4 \text{ ft}$

Step 2: $1,742.4 \text{ ft} \times 20 \text{ ft} \times 17 \text{ ft} = 592.416 \text{ cu ft}$

Step 3: Density has been given as 0.85

Step 4: $(592.416 \times 0.85)/1,000 = 503.5$ gal/acre

Step 5: Using the volume of spray to run-off calculated in Step 4 above, calculate the lb a.i./acre using the formula of Procedure 1 (Step 3).

Procedure 3. Estimation of Gallons of Pesticide Spray Solution per Acre to Spray to Run-off or LV Application at the Full Leaf Stage of Canopy Using the following Table

Tree height (ft) X Tree width (ft) ^b	Spray Type	Gallons Per Acre ^a distance between tree rows (ft)												
		16	18	20	22	24	26	28	30	32	34	36	38	40
80	HV	152	136											
	LV	20 ^c	17 ^c											
100	HV	191	169	152										
	LV	25	22 ^c	20 ^c										
150	HV	256	254	229	208	191								
	LV	37	33	29	27	25								
200	HV	...	...	305	277	254	235	218						
	LV	...	...	39	36	33	30	28						
250	HV	...	...	...	346	317	293	272	254	238				
	LV	...	...	...	45	41	38	35	33	31				
300	HV	...	...	...	416	381	352	327	305	286	269	254	241	229
	LV	...	...	...	53	49	45	42	39	37	35	33	31	29
350	HV	...	...	...	...	445	411	381	356	334	314	296	281	267
	LV	...	...	...	...	57	53	49	46	43	40	38	36	34
400	HV	...	...	...	...	...	469	436	407	381	359	339	321	305
	LV	...	...	...	...	...	60	56	52	49	46	44	41	39
450	HV	...	...	...	...	...	...	490	457	429	404	381	361	343
	LV	...	...	...	...	...	...	63	59	55	52	49	46	44
500	HV	...	...	...	...	...	...	...	508	476	448	424	401	381
	LV	...	...	...	...	...	...	...	65	61	58	54	52	49
550	HV	...	...	...	...	...	...	...	...	524	493	466	441	419
	LV	...	...	...	...	...	...	...	...	67	63	60	57	54
600	HV	...	...	...	...	...	...	...	...	...	538	508	481	457
	LV	...	...	...	...	...	...	...	...	...	69	65	62	59

^a See text for full details of calculation. All values rounded to the nearest whole gallon. Based on standard dosage volumes of 0.7 gallon per 1,000 cu ft TRV for HV and 0.09 gallon for LV sprays. Trees which have a very dense foliar canopy may require slightly more spray volume than shown.

^b Where small trees are interplanted with large trees in the same row, use only the large tree dimensions.

^c LV applications of less than 25 gallons per acre are not generally recommended because of other factors affecting coverage.

^d Data not given because the combination of this tree size on this planting density is unlikely.

The amount of a.i./acre can be calculated by using the volume of spray to run-off per acre found in the table above into the formula used in Procedure 1 (Step 3) above.

Procedure 4. For Low Volume (LV) and Ultra-low Volume (ULV) Applications to Orchards

Take the amount of a.i./A for orchard calculated from Procedure 1; the TRV estimated from Procedure 2; or the full leaf stage of canopy table from Procedure 3; and add to X gal of water/A for LV applications or Y gal of water and/or other solvent/A. X and/or Y is (are) determined by petitioner to coincide with proposed use. Less active ingredient/A is normally required for LV and ULV applications. The lower amount of active ingredient/A, if proposed, should be stated as a fraction of the high volume rate. Residue data must be submitted for all uses proposed on the label. Therefore, LV and/or ULV applications will not be allowed if residue data is submitted for HV applications only.

cc: Circu., R.F., S.F., EAB, PP#4E3146, EEB TOX, PM#43, W.T.Chin, PMSD-ISB
RDI: P.V.Errico(2/x/87): R.D.Schmitt(2/x/87)
TS-769: RCB: CM#2: RM812:557-4352: W.T.Chin:wc(2/x/87)

6