



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

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

July 7, 1986

MEMORANDUM

SUBJECT: APPLICATION PRACTICE DATA NECESSARY FOR EBDC SPECIAL
REVIEW

FROM: J. Dean Hansen, Plant Pathologist
Science Support Branch
Benefits and Use Division (TS-768C)

A handwritten signature in cursive script, reading "J. Dean Hansen".

TO: Edward Zager, Section Head
Special Registration Section #2
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

Application practice information is herewith supplied for mancozeb, maneb, and Metiram® as requested by your memorandum of May 27, 1986. This should assist you in making the necessary dietary exposure analyses.

APPLICATION PRACTICES FOR FOOD CROP USAGE
FOR SELECTED EBDC FUNGICIDES
(Mancozeb, Maneb, Metiram and Nabam)

Prepared by:

J. Dean Hansen
Plant Pathologist

and

E. Neil Pelletier, Ph.D.
Plant Pathologist
Science Support Branch
Benefit and Use Division

July 3, 1986

Application Practices for Food Crop Usage for Selected EBDC Fungicides

(Mancozeb, Maneb, Metiram and Nabam)

Nabam (Usage and percentage of crop treated): According to usage data provided by The Economic Analysis Branch, nabam is not currently used on agricultural sites (Ballard, 1985). Nabam's applications are limited to use as a biocide for industrial sites such as cooling towers, paper mills and sugar mills. (For agricultural use, the standard practice was to tank mix nabam with zinc sulfate prior to application to form a product equivalent to zineb.) Thus agricultural use practices for nabam are not addressed in this report.

Mancozeb, Maneb and Metiram - Use Rates:

Use rates and number of applications for individual EBDC fungicides vary not only with the type and variety of crop, but also vary with the growth stage of the crop, the anticipated disease pressure, and the environmental conditions under which a crop is grown. For example, apples grown in the midwest require more frequent applications of an EBDC fungicide than the apples grown in the Northwest, because environmental conditions in the midwest are more conducive to disease development than conditions in the Northwest. Therefore, dosage (number of applications times use rate) must be presented as a dosage range.

Sites:

The sites are representative of the major uses for mancozeb, maneb and metiram. These are presented in table 1A, 1B, 1C and 1D for mancozeb; 2A, 2B, 2C, 2D, 2E and 2F for maneb and 3A and 3B for metiram.

Percentage of Crops Treated:

The estimated percentage of crops treated with EBDC fungicide is based on 1979 estimates of the number of US acres receiving EBDC treatments and the total US acres in production. The 1979 estimates were obtained as part of the EBDC RPAR process and the US acreage production figures were obtained from the 1978 Census of Agriculture. It is assumed that the EBDC treated acreage has not significantly changed since 1979. This information is presented in table 4.

Table 1A.

SITES, APPLICATION RATES, AND USE PRACTICES FOR EBDIC'S

(For representative crops for which MANCOZEB is registered)

CROP	USE RATES A.I. POUNDS/ACRES	NUMBER SEASONAL APPLICATIONS		DOSAGE RANGE A.I. (No. appl. x rate) (pounds)	PREHARVEST INTERVALS (PHI) AND LIMITATIONS
		MINIMUM	MAXIMUM		
Apples	<i>guide is wrong, use 1 lb/A</i> 0.8-1.6 lb/100 gal	5	12	8 to 120 96	21 days PHI. for a few states. 30 days PHI. for all others through 10 pounds per acre. Delayed dormant and cover sprays.
Fruit rots					
Leaf spots					
Twig blight					
Asparagus Rust	1.6-2.4 lb/A	4	4	6.4 to 9.6	Apply to field after harvest.
Bananas Cercospora leaf spot	1.6-3.4 lb/A	8	16	12.8 to 54.4	0 days PHI. Begin when disease first appears and repeat at 2 to 3 week intervals.
Cabbage Downy mildew Alternaria	0.8-2.4 lb/A	6	9	4.8 to 21.6	7 day PHI. 3 to 10 day intervals.
Cantaloupe Downy mildew	1.6-2.4 lb/A	8	14	12.8 to 33.6	5 day PHI. 5 to 7 day intervals.
Caprifigs (internal fruit rot) (Fusarium)	3.3 lb/100 gal (as a dip)		1		After 4 to 5 loads, replace mixture.
Carrots Alternaria leaf spot	1.2-1.6 lb/A	6	12	7.2 to 19.2	0 day PHI. 7 to 10 day interval Begin at first disease occurrence.

EPA value is 1.6 lb/A

Table 1B.

SITES, APPLICATION RATES, AND USE PRACTICES FOR EBDG'S (cont'd)

(For representative crops for which MANCOZEB is registered)

CROP	USE RATES A.I. POUNDS/ACRES	NUMBER SEASONAL APPLICATIONS		DOSAGE RANGE A.I. (No. appl. x rate)	PREHARVEST INTERVALS (PHI) AND LIMITATIONS
		MINIMUM	MAXIMUM		
Celery Blight (Transplant to harvest= 85 to 100 days)	1.6-1.7 lb/A	7	12	11.2 to 20.4	14 day PHI. Field application every 7 to 10 days. Or: Every 3 to 5 days for plant-bed.
<u>Crabapples</u> Fruit rots Leaf spots Twig blight	0.8-1.7 lb/100 gal (200-500 gal/A)	5	12	8 to 120	15 days PHI. through 8.4 pounds per acre Delayed dormant and foliar applications
<u>Cranberries</u>	2.4-5.0 lb/A	5	12	12 to 60	30 day PHI.
<u>Cucumber</u> Downy mildew	1.57-2.5 lb/A	6	15	9.4 to 37.5	5 day PHI. Begin when first true leaf emerges or at first disease occurrence, then every 5 to 14 days.
<u>Fennel</u>	1.57-1.7 lb/A	7	12	11 to 20.4	7 day PHI. Apply at emergence and at 7 day intervals.
<u>Grapes</u> Black rot Bunch rot	1.2-3.4 lb/A	3	6	3.6 to 20.4	66 day PHI. for all states except CA. For CA: Do not apply after fruit sets.
<u>Melons (Misc)</u> Downy mildew	1.6-2.4 lb/A	8	14	12.8 to 33.6	5 day PHI. 5 to 7 day intervals.
<u>Onion</u> Blotch Blast and Downy mildew	2.4 lb/A	6	8	14.4 to 19.2	7 day PHI. Begin when disease first becomes visible.

Table 1C. SITES, APPLICATION RATES, AND USE PRACTICES FOR EBDG'S (cont'd)

(For representative crops for which MANCOZEB is registered)

CROP	USE RATES A.I. POUNDS/ACRES	NUMBER SEASONAL APPLICATIONS		DOSAGE RANGE A.I. (No. appl. x rate) (pounds)	PREHARVEST INTERVALS (PHI) AND LIMITATIONS
		MINIMUM	MAXIMUM		
Onion Blotch Downy mildew Blast	1.6-2.4 lb/A	6	8	9.6 to 19.2	7 day PHI. 7 day interval.
Papaya Anthracnose Phytophthora fruit rot	1.57-2.1 lb/A	6	14	9.4 to 29.4	0 days PHI. Apply at flowering to crown, blossom area, central column and developing fruit.
Peanuts Cercospora leaf spot	0.8-1.7 lb/A	6	14	4.8 to 23.8	14 day PHI. 7 to 14 day interval.
Pears Fruit rots Leaf spots Twig blight	0.8-1.7 lb/100 gal (200-500 gal/A)	5	12	8 to 120	15 days PHI. through 8.4 pounds per acre Delayed dormant and foliar applications
Pineapple	25.2-27 lb/100 gal/A (at planting)			25.2 to 27	Preplant dip for treatment of plant- ing material
Potato Blights	0.8-1.6 lb/A	6	9	9.6 - 14.4 <i>Mancozeb</i>	0 days PHI. Apply when plants are 4 to 6 inches tall.
Quince Fruit rots Leaf spots Twig blight	0.8-1.7 lb/100 gal (200-500 gal/A)	5	12	8 to 120	15 days PHI. through 8.4 pounds per acre Delayed dormant and foliar applications

Table 1D. SITES, APPLICATION RATES, AND USE PRACTICES FOR EBD'C'S (cont'd)

(For representative crops for which MANCOZEB is registered)

<u>CROP</u>	<u>USE RATES A.I. POUNDS/ACRES</u>	<u>NUMBER SEASONAL APPLICATIONS</u>		<u>DOSAGE RANGE A.I. (No. appl. x rate) (pounds)</u>	<u>PREHARVEST INTERVALS (PHI) AND LIMITATIONS</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>		
<u>Squash, summer Downy mildew</u>	1.57-2.5 lb/A	8	15	12.6 to 37.5	5 day PHI. Begin when first true leaf emerges or at first disease occurrence, then every 5 to 14 days.
<u>Sweet Corn Helminthosporium</u>	1.2 lb/A	10	18	18 to 21.6	7 day PHI. 4 to 7 day intervals.
<u>Sweet Corn Rust</u>	1.2 lb/A	2	5	2.4 to 6	7 day PHI. Begin when disease appears and repeat at 10 to 14 day intervals.
<u>Sugar beet Cercospora leaf spot</u>	1.2-1.7 lb/A	4	12	4.8 to 20.4	14 day PHI. Apply at first disease occurrence. Repeat at 7-10 day intervals.
<u>Tomato Blights</u>	1.2-2.4 lb/A	4	15	4.8 to 36	5 day PHI. Begin application when the first fruit clusters are visible and continue every 7 to 12 days.
<u>Watermelons Downy mildew</u>	1.6-2.4 lb/A	8	14	12.8 to 33.6	5 day PHI. Apply at 5 to 7 day intervals.

Table 4. Estimated Percentage of Food Crops Treated with EBDC Fungicides

<u>Crop</u>	<u>Estimated Acres Treated</u>	<u>Total US Acres</u>	<u>Percentage of Crop Treated</u>
<u>Fruit</u>			
Apples	184,000	577,000	32
Apricots	<500	30,562	2
Cherries	<500	129,563	<1
Citrus	46,000	1,302,612	3
Grapes	8,000	762,536	1
Nectarines	250	23,127	1
Peaches	2,700	262,587	1
Pears	40,000	95,425	41
Plums & Prunes	2,300	141,439	1.6
<u>Vegetables</u>			
Cabbage	43,400	102,239	42
Cantaloupe	21,400	110,572	19
Celery	15,000	37,881	39
Cucumber	86,600	125,892	68
Lettuce	66,900	253,020	26
Lima beans	9,000	72,144	12
Onions	52,600	127,697	41
Peppers	24,000	87,247	27
Potatoes	1,156,000	1,395,150	85
Snap beans	58,400	341,374	17
Spinach	7,000	33,031	21
Sweet corn	183,100	674,128	27
Tomatoes	145,700	425,317	34
Watermelons	141,000	181,436	77
<u>Field Crops</u>			
Barley	400,000	8,975,538	4
Dry beans	50,000	1,317,141	3.8
Peanuts	275,000	1,434,353	19
Sugar beets	10,000	1,248,823	<1
Wheat	1,000,000	54,457,876	1.9
Wild rice	15,000	- - - -	

4