FILE COPY

Date Out of EFB: JUN 17 1982

To: Henry Jacoby
Product Manager 21
Registration Division (TS-767)

From: Mr. Samuel Creeger, Head (acting)
Review Section No. 1
Environmental Fate Branch
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No.: 3125-320

Chemical: Bayleton

[1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone]

Type Product: Fungicide

Product Name: ®Bayleton 50% Wettable Powder

Company Name: Mobay

Submission Purpose: Worker Exposure Analysis - Use on Pears

ZBB Code: other

ACTION CODE: 330

Date In: 4/13/82

EFB # 280

Date Completed: 6/17/82

TAIS (level II)	Days
76	1

(apples, grapes and stone fruits attached)

Date Out of EFB: JUN 17 1982

To: Henry Jacoby
Product Manager 21
Registration Division (TS-767)

From: Mr. Samuel Creeger, Head (acting)
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Reg./File No.: 3125-320

Chemical: Bayleton

[1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone]

Type Product: Fungicide

Product Name: ®Bayleton 50% Wettable Powder

Company Name: Mobay

Submission Purpose: Worker Exposure Analysis - Use on Apples and Grapes

ZBB Code: other

ACTION CODE: 435

Date In: 4/21/82

EFB # 292

Date Completed: 6/17/82

TAIS (level II)	Days
76	1

2

Date Out of EFB: JUN 17 1982

To: Henry Jacoby
Product Manager 21
Registration Division (TS-767)

From: Mr. Samuel Creeger, Head (acting)
Review Section No. 1
Environmental Fate Branch
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No.: 3125-EUP-RTT

Chemical: Bayleton

[1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone]

Type Product: Fungicide

Product Name: ®Bayleton 50% Wettable Powder

Company Name: Mobay

Submission Purpose: Worker Exposure Analysis - Use on Stone Fruits

ZBB Code: other

Date In: 4/23/82

Date Completed: 6/17/82

ACTION CODE: 750

EFB # 301

TAIS (level II)	Days
76	1

3

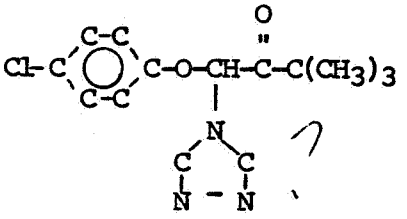
1.0 INTRODUCTION

Three deferrals to EFB have been received, each requiring an estimate of applicator exposure to Bayleton [1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone].

The TB review of 3/24/82 involves a new use on pears, the 3/30/82 review an EUP for use on stone fruits, and the 3/23/82 review a new use on apples and grapes.

Since the same formulation (50% WP) is involved in each case, the three deferrals will be combined.

2.0 STRUCTURE



3.0 DIRECTIONS FOR USE

Copies of the respective labels are appended to this review.

4.0 EXPOSURE ANALYSIS

4.1 Assumptions

1. The 50% WP Bayleton formulation behaves identically to the 50% WP Benomyl formulation.

2. Agricultural practices for the two chemicals are identical.

Assumption #1 is based on the following reasoning: Mixer-loader/applicator exposure to any pesticide is more likely related to the kind of formulation than to the specific physical and/or chemical properties of the active ingredient. That is, 50% WP formulations should yield roughly similar human exposure patterns when used identically.

Assumption #2 is confirmed by examination of the labels. A copy of a comparable Benomyl label is appended to this review.

4.2 The following format and discussion is based on Day, H.R. 1978. Final Exposure Analysis for Benomyl. Environmental Fate Branch, Hazard Evaluation Division (TS-769). November 28, 1978.

4.2.1 Application of Bayleton is either by ground rig, air blast equipment hand spraying or aircraft, usually at 7 to 14 day intervals, as necessary. It may also be applied mixed with oil to stone fruit and to apples.

Recommended use dilutions are as follows:

	Crop	Max. Rate (lb a.i./A)	Dilution (gal.)	Maximum Conc. (% w/w)	Maximum Appl./ Season
Aerial	Apples	0.25	5	1.25	3
	Grapes	0.2	5	4.0	3
	Pears	0.25	5	5.0	3
	Stone Fruit	1.0	5	25.	4
	Almonds	1.0	5	25.	2
Ground	Apples	0.25	20	1.25	3
	Grapes	0.2	20	0.1	3
	Pears	0.25	20	1.25	3
	Stone Fruit	1.0	20	0.5	4
	Almonds	1.0	20	0.5	2

4.2.2 Additional Assumptions

1. The spray concentrations listed in 4.2.1 are in common use.
2. An applicator weighs 60 kg.
3. Equipment used to apply Bayleton and applicator protection are comparable to examples used by Wolfe and Durham[1] in their calculation of worker exposure to pesticides.
4. Label directions are followed.
5. Total Bayleton in current use, as well as crop proportionality, are essentially the same as for Benomyl.

4.2.3 Usage Data

Usage data on Bayleton is not available. Based on 1977 Benomyl data[2], usage of Bayleton may be assumed to be as follows:

1/ Wolf, H.R. and W.F. Durham. 1967. Exposure of Workers to Pesticides. Arch. Environ. Health. Vol. 14. April, 1967.

2/ USDA/State/EPA Benomyl Assessment Team. An Analysis of Current Benomyl Uses: Their Benefit, the Role of Alternatives, and Impacts to Agriculture from Changes in Benomyl Use patterns. U.S. Department of AGriculture. July, 1978.

Bayleton Usage Data (est.)

Crop	Total Pounds Used	Percent of Total
Stone Fruit	344,000	11.3
Grapes	173,692	5.7
Apples	96,184	3.2
Pears	10,923	0.4
Other Crops	2,418,583	79.4
Total Usage	3,043,387	100.0

4.2.4 Mixer-Loader Exposure

According to the Jegier[3], mixer-loaders received the highest relative exposure (both dermal and respiratory), due to direct handling of pesticide concentrates. Based on data for a 25% Guthion WP, Jegier measured dermal and respiratory exposures of 53 and 1.27 mg/hr, respectively. Since Bayleton is twice as concentrated, these figures are doubled. Unit exposure would then be...

Dermal: 106 mg/hr/60kg body-weight or 1.8 mg/kg/hr.
Respiratory: 2.54 mg/hr/60kg body-weight or 0.04 mg/kg/hr.

Applicator Exposure - Ground

Wolfe and Durham[1] reported exposure of applicators using air blast equipment in apple orchards as follows:

Dermal: 30 mg/hr/60kg body-weight or 0.5 mg/kg/hr.
Respiratory: 0.04 mg/hr/60kg body-weight or 0.0007 mg/kg/hr.

Applicator Exposure - Aerial

Jeiger[3] monitored pilots applying Endrin at a rate of 0.6 lb/gallon (7.1% w/w) to 27 acres. This is roughly equivalent to a Bayleton application rate of 1 lb a.i./A in 10 gallons [1.2% w/w]. Therefore, extrapolated exposures would be:

Dermal: 1.18 mg/hr/60kg body-weight or 0.02 mg/kg/hr.
Respiratory: 0.08 mg/hr/60kg body-weight or 0.001 mg/kg/hr.

3/ Jegier, Z. 1964. Health Hazards in Insecticide Spraying of Crops. Arch. Environ. Health. 8:670. 1964.

Exposure from Drift

Caplan's[4] measurement of dermal exposure of persons directly under the spray application (2.17 mg/incident) may be adjusted for the difference in application rates (1.0:0.46) to yield an estimated dermal exposure for Bayleton of 7.8 mg/60kg or 0.13 mg/kg body-weight/incident.

Exposure of Flaggers

Adjusting Wolf's[2] parathion data, exposure of a flagger to application of a 1.2% Bayleton spray would be:

Dermal: 84 mg/hr/60kg body-weight x 1.2/9 = 0.19 mg/kg/hr.
Respiratory: 0.02 mg/hr/60kg body-weight x 1.2/9 = 0.00004 mg/kg/hr.

4.2.5 Overall Exposures, by Use Pattern

Use Pattern	Exposed Group	Number	Hrs/ Year	Exposure (mg/kg BW/year) Dermal	Respir.
Stone Fruit (aerial)	Pilots	120	120	2.4	0.12
	Mixer/L's	300	240	432.0	9.6
	Flaggers	240	240	45.6	0.0096
Stone Fruit (air blast)	Applicators (commercial)	60	280	140.0	0.2
Stone Fruit (air blast)	Applicators (private)	3000	48	24.0	0.034
Grapes (aerial)	Pilots	20	15	0.3	0.015
	Mixer/L's	40	40	72.0	1.6
	Flaggers	50	40	7.6	0.0001
Grapes (airblast)	Applicators (commercial)	60	60	30.0	0.04
Grapes (airblast)	Applicators (private)	40	60	30.0	0.04
Fruit Crops (aerial)	Pilots	20	150	3.0	0.15
	Mixer/L's	40	400	720.0	16.0
	Flaggers	50	400	76.0	0.016
Fruit Crops (airblast)	Applicators (private)	21,000	72	36.0	0.05

4/ Caplan, B.D. and W.C. Thielan. 1956. Human Exposure of Populated Areas During Plane Application of Malathion. AMA Arch. Ind. Health. 14:326. 1956.

5.0 CONCLUSIONS

I have estimated the dermal and respiratory exposure to Bayleton by extrapolation from surrogate data. The accuracy of these estimates is, at best, +/- one order of magnitude. This should be borne in mind when using the conclusions to estimate toxicological impact.

Emil Regelman
Chemist
EFB/HED TS-769C
June 17, 1982

Triadimefon environmental fate review

Page _____ is not included in this copy.

Pages 9 through 15 are not included in this copy.

The material not included contains the following type of information:

___ Identity of product inert ingredients

___ Identity of product impurities

___ Description of the product manufacturing process

___ Description of product quality control procedures

___ Identity of the source of product ingredients

___ Sales or other commercial/financial information

X A draft product label

___ The product confidential statement of formula

___ Information about a pending registration action

___ FIFRA registration data

___ The document is a duplicate of page(s) _____

___ The document is not responsive to the request

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

DU PONT

BENLATE®

FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT:
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate] ... 50%
INERT INGREDIENTS ... 50%

U.S. Pat. 3,541,213 & 3,631,176 EPA Reg. No. 352-354

Keep out of reach of children.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using.

First Aid: In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

ENRIVONMENTAL HAZARDS

This product is toxic to fish. Keep out of lakes, streams or ponds. Do not apply where runoff is likely to occur or ... apply when weather conditions favor drift from areas treated.

PHYSICAL OR CHEMICAL HAZARDS

Keep away from fire or sparks.

NET 2 LBS.

E. I. du Pont de Nemours & Co. (Inc.)

Biochemicals Department, Wilmington, Delaware

NOTICE OF WARRANTY

Du Pont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with the directions under normal use conditions. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Du Pont. In no case shall Du Pont be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the Buyer. DU PONT MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

NOTICE TO BUYER: Purchase of this material does not confer any rights under patents of countries outside of the United States.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feeds by storage or disposal.

STORAGE: Never allow "Benlate" to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container tightly closed when not in use.

PESTICIDE DISPOSAL: Pesticide, spray mixture or rinsate that cannot be used according to label instructions must be disposed of according to federal, state or local procedures under the Resource Conservation and Recovery Act.

CONTAINER DISPOSAL: Dispose of bags according to approved federal, state or local procedures under the Resource Conservation and Recovery Act.

ACCEPTED

OCT 20 1981

EPA Reg. No.

Made in U.S.A. Printed in U.S.A.

DU PONT

BENLATE®

FUNGICIDE

DIRECTIONS FOR USE—SEE FOLDER IN BOTTOM FLAP

ALMONDS: Brown Rot Blossom Blight

APPLES: Certain Diseases of Fruit and Foliage (Tank Mixture), Postharvest Fruit Rots (Botrytis spp., Penicillium spp., Gloeosporium spp.)

AVOCADOS (Florida). Scab, Cercospora Spot, Anthracnose

BEANS: White Rot (Sclerotinia), Gray Mold (Botrytis)

BLUEBERRIES: Mummy Berry, Botrytis Blossom Blight, Anthracnose Leafspot

CABBAGE (Seed Crop, Pacific Northwest): White Blight (Sclerotinia Stalk Rot)

CANEBERRIES—RASPBERRIES, BLACKBERRIES, BOYSENBERRIES, LOGANBERRIES, DEWBERRIES: Botrytis, Powder, Mildew, Penicillium Rots

CELERY: Early Blight (Cercospora), Late Blight (Septoria)

CITRUS: Scab, Greasy Spot, Fruit Decay (Green Mold, Blue Mold, Stem end Rot)

CUCURBITS—CUCUMBERS, MELONS, PUMPKINS, SUMMER AND WINTER SQUASH: Target Spot (Cucumbers), Gummy Stem Blight, Powdery Mildew, Anthracnose

GRAPES: Botrytis Bunch Rot; Powdery Mildew, Black Rot, Bitter Rot—East of Rockies

MACADAMIA NUTS (Hawaii): Botrytis Blossom Blight

MANGOES: Anthracnose

MUSHROOMS: Verticillium Spot (Dry Bubble)

PEANUTS: Cercospora Leafspot, Rust, Ascochyta Web Blotch (Tank Mixture)

PEARS: Scab, Powdery Mildew, Sooty Blotch, Flyspeck, Postharvest Fruit Rots (Botrytis spp., Penicillium spp., Gloeosporium spp.)

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew, Liverspot, Zonate Leafspot, Fungal Leaf Scorch

PINEAPPLE: Thielaviopsis Rot (Fresh Fruit), Pineapple Butt Rot (Thielaviopsis paradoxa)

RICE: (Except Calif.) Rice Blast, Stem Rot

SOYBEANS: Diaporthe Pod-and-Stem Blight, Anthracnose, Septoria Brown Spot, Cercospora Frogeye Leafspot, Purple Seed Stain

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Brown Rot (Blossom Blight and Fruit Rot), Peach Scab, Powdery Mildew, Cherry Leaf Spot, Postharvest Fruit Rots

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot, Botrytis Crown Rot

SUGAR BEETS: Cercospora Leafspot

SUGARCANE (Hawaii): Pineapple Disease (Ceratocystis paradoxa)

TOMATOES: Gray Mold (Botrytis), Leaf Mold (Cladosporium), White Mold (Sclerotinia), Cercospora Leafspot, Phoma Leafspot

ROSES, FLOWERS, ORNAMENTALS, SHADE TREES: Powdery Mildew, Botrytis Gray Mold, Anthracnose, Black Spot (Roses), Certain Other Diseases

BULBS—EASTER LILY, TULIP, GLADIOLUS, DAFFODIL, IRIS: Fusarium and Penicillium Rots

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DU PONT

BENLATE

WETTABLE POWDER

Product Labeling

DIRECTIONS FOR USE
OCT 2 0 1981
Under the Federal Insecticide [illegible] registered under EPA Reg. No.

ACTIVE INGREDIENT

Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate] 50%

INERT INGREDIENTS 50%

[illegible] EPA Reg. No. [illegible]

Keep out of reach of children.

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN.

Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using.

First Aid: In case of contact, flush skin or eyes with plenty of water: for eyes, get medical attention.

ENVIRONMENTAL HAZARDS

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from areas treated.

PHYSICAL OR CHEMICAL HAZARDS

Keep away from fire or sparks.

NOTICE OF WARRANTY

Du Pont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with the directions under normal use conditions. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Du Pont. In no case shall Du Pont be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the Buyer. DU PONT MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistant with its labeling.

Du Pont "Benlate" should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Du Pont will not be responsible for losses or damages resulting from use of this product in any manner not specifically recommended by Du Pont. User assumes all risk associated with such non-recommended use.

"Benlate" is a systemic fungicide recommended for the control of many important plant diseases. If treatment is not effective following use of "Benlate" as recommended, a resistant strain of the fungus may be present. If treatment is ineffective due to the presence of a benomyl resistant strain, then neither "Benlate", nor any other benzimidazole or thiophanate type fungicide will effectively control that disease; consideration should be given to prompt use of other types of suitable fungicides.

The repeated exclusive use of "Benlate" may lead to buildup of resistant strains of fungi and loss of disease control. A spray program using other fungicides may delay resistant strain buildup. Consult your state extension specialist or official state recommendations for guidance on your particular crop and disease control situation.

Note: Do not tank mix or alternate "Benlate" with benzimidazole or thiophanate products such as "Mertect"[1] or "Topsin"[2].

Apply as a spray with ground equipment (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. Under severe disease conditions use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees. For aerial application (listed crops only) use the following gals. per acre: Rice and Soybeans, 3 to 10; Cabbage (seed crop), Celery, Cucurbits, Peanuts, and Sugar Beets, 5 to 10; Almonds, Avocados, Beans, Pecans, Stone Fruits, and Strawberries, 10 to 20; Grapes, 15 to 20; Roses, Flowers, Ornamentals and Shade Trees, 20 gals. per acre minimum.

For use in small gardens and orchards (less than 1 acre), application rates may be converted to lbs. per 100 gals. by dividing the lbs. per acre rate in half, and applying the resulting spray mixture at the rate of 4.5 gals. per 1000 sq. ft. (1 lb. "Benlate" per 100 gals. equals 1 tablespoonful per gal.).

Add required amount of "Benlate" to necessary volume of water in spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not tank mix "Benlate" with lime or alkaline pesticides such as Bordeaux mixture or lime sulfur.

[1]Registered trademark of Merck & Co.
[2]Registered trademark of Nippon Soda Co., Japan

Where use of spray oil is recommended (apples, peanuts, pecans, stone fruits), use a [illegible] superior type (60 to 70 second viscosity) spray oil; add as last ingredient to spray tank. Before applying other pesticides in conjunction with spray oil or immediately before or after oil application, consult product labels. Observe all cautions and limitations on labeling of all products used in mixtures.

ALMONDS: **Brown Rot Blossom Blight**—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half- to full-bloom.

APPLES: For applications through cover sprays, use "Benlate" as a tank mixture as detailed below. Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of products per acre with concentrate sprayers. Do not graze livestock in treated orchards.

"Benlate" + "Manzate" 200 Fungicide: Scab, Powdery Mildew, Sooty Blotch, Flyspeck, Cedar Apple Rust, Quince Rust, Bitter Rot, Black Rot, Brown Rot—Use 2 to 3 ozs. "Benlate" plus 12 ozs. "Manzate" 200 per 100 gals. of water; 1 qt. spray oil may be added per 100 gals. Apply at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays.

Use the 3 oz. rate of "Benlate" and add spray oil to the spray mixture for varieties more susceptible to powdery mildew, and for scab if an application is missed during an infection period (apply as soon as possible after infection period in order to deactivate scab and to prevent further infection). Do not apply within 30 days of harvest.

"Benlate" + Captan: Scab, Powdery Mildew, Sooty Blotch, Flyspeck, Bitter Rot, Black Rot—Use 2 to 3 ozs. "Benlate" plus 12 to 16 ozs. Captan 50WP Fungicide (or 7½ to 10 ozs. Captan 80WP) per 100 gals. of water. Apply at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. Use the 3 oz. rate of "Benlate" for varieties more susceptible to powdery mildew. If an application is missed during an infection period, apply the higher rates as soon as possible after the infection period in order to deactivate scab and to prevent further infection. **Note:** Spray injury may result if Captan is used with, immediately before, or closely following an oil spray.

Postharvest Fruit Rots (Botrytis spp., Penicillium spp., Gloeosporium spp.)—Make a single application of 6 ozs. "Benlate" per 100 gals. anytime from 3 weeks before harvest up to day of harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 ozs. per 100 gals.

AVOCADOS (Florida): Scab, Cercospora Spot, Anthracnose—Apply 1 to 2 lbs. per acre; begin when buds swell and repeat at 3- to 4-week intervals. Do not apply within 30 days of harvest.

BEANS: White Mold (Sclerotinia), Gray Mold (Botrytis)—Use on beans grown as fresh vegetables, for processing, or for the dry bean market. Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. For narrow-row (20-24") irrigated dry beans in Montana, Nebraska, Colorado and Wyoming, apply at initial bloom and repeat 7 to 10 days later; only partial control of white mold may result. Do not apply within 14 days of harvest (28 days for lima beans); do not use where crop is grown only for forage purposes.

BLUEBERRIES: Apply 1 lb. per acre. Do not make more than 4 applications before harvest; do not apply within 21 days of harvest. **Mummy Berry, Botrytis Blossom Blight**—Apply at green tip and repeat at 7- to 10-day intervals through petal fall. **Anthracnose Leafspot**—Apply when disease first appears and make one additional application 14 days later. After harvest, make up to 4 applications to the bushes at 14-day intervals as needed.

CABBAGE (Seed Crop, Pacific Northwest): White Blight (Sclerotinia Stalk Rot)—Apply 2 lbs. per acre by aircraft in 5 to 10 gals. of water; add a spreader-sticker to aid in wetting plants. Make first application at first petal fall; make two additional applications at 14-day intervals if conditions favor development of disease. **Note:** Do not graze treated areas; do not use seed or plant parts for food or feed purposes.

CANEBERRIES—RASPBERRIES, BLACKBERRIES, BOYSENBERRIES, LOGANBERRIES, DEWBERRIES: Botrytis, Powdery Mildew, Penicillium Rots—Apply ¾ lb. per acre at early bloom (5 to 10%) and at full bloom; make up to 3 additional applications at 14-day intervals as needed. Do not apply within 3 days of harvest.

CELERY: Early Blight (Cercospora), Late Blight (Septoria)—Apply ¼ to ½ lb. per acre; begin when disease first appears and repeat at 7- to 10-day intervals. Do not apply within 7 days of harvest.

CITRUS: Scab—Apply 1½ to 3 lbs. per acre. Under conditions of severe disease pressure, apply at pinhead stage (just prior to first flush) and repeat at ⅔ petal fall; otherwise, make a single application at ⅔ petal fall.

Greasy Spot—Make a single application of 1½ to 3 lbs. per acre during the period mid-June to mid-July.

Fruit Decay (Green Mold, Blue Mold, Stem-end Rot)—Preharvest Spray—Make a single application of 1 to 2 lbs. per acre anytime from 3 weeks prior to harvest up to day of harvest. **Postharvest**—Apply as a dip, flood, or spray using 1 to 2 lbs. per 100 gals.; do not immerse fruit for more than 5 min. When citrus wax is used, "Benlate" may be incorporated into the wax spray. Use the higher rate on more susceptible fruits and when excessive inoculum levels are present. For control of sporulation (*Penicillium spp.*), apply as a spray in citrus wax using 4 lbs. "Benlate" per 100 gals.

Note: Do not graze livestock in treated groves.

CUCURBITS—CUCUMBERS, MELONS, PUMPKINS, SUMMER AND WINTER SQUASH: Target Spot (Cucumbers), Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply

CONTINUED ON OTHER SIDE

CONTINUED FROM OTHER SIDE

¼ to ½ lb. per acre; for aerial application, use ½ lb. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed. For target spot, use 7-day intervals as needed.

GRAPES: Botrytis Bunch Rot—Apply 1 to 1½ lbs. per acre at first bloom (no later than 5% bloom) and repeat 14 days later if severe disease conditions persist. Make an additional application 3 to 4 weeks before harvest or when sugar begins to build; repeat 14 days later if conditions favorable for disease persist. "Benlate" does not control bunch rots caused by other organisms such as *Rhizopus spp.*, *Alternaria spp.*, and *Diplodia spp.*; these rots occur most frequently in high temperature areas such as the San Joaquin and Sacramento Valleys of California. **Powdery Mildew, Black Rot, Bitter Rot—East of Rockies**—Apply ¾ to 1½ lbs. per acre when foliage first develops and repeat at 14- to 21-day intervals, or as needed, until berries are full size.

Note: Do not apply within 7 days of harvest.

MACADAMIA NUTS (Hawaii): Botrytis Blossom Blight—Apply 1¼ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: "Benlate" + "Manzate" 200 Fungicide: Cercospora Leafspot, Rust, Ascochyta Web Blotch—Apply ¼ lb. "Benlate" plus 1½ lbs. "Manzate" 200 per acre; spray oil may be added at the rate of 1 pt. to 1 qt. per acre. Begin applications 35 to 40 days after planting or when disease first appears. Repeat at following intervals: for Cercospora leafspot, 10 to 14 days; for rust, 7 to 10 days; for Ascochyta web blotch, 7 to 14 days. Do not apply within 14 days of harvest; do not graze or feed treated vines, hay, or hulls to livestock.

PEARS: Scab, Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 ozs. per 100 gals. of water; apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Apply at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed during an infection period, use 6 ozs. per 100 gals. and apply as soon as possible after the infection period in order to deactivate scab and to prevent further infection. Do not graze livestock in treated orchards.

Postharvest Fruit Rots (Botrytis spp., Penicillium spp., Gloeosporium spp.)—Make a single application of 6 ozs. per 100 gals. anytime from 3 weeks before harvest up to day of harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 ozs. per 100 gals.

Overwintering Scab—Apply 8 ozs. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew, Liverspot, Zonate Leafspot, Fungal Leaf Scorch—Apply ½ to 1 lb. per acre; use the higher rate on trees over 30' tall. For aerial application (Ark., La., Miss., Okla., Tex. only), use 1 lb. per acre. Spray oil may be added at the rate of 1 to 2 gals per acre. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Thielaviopsis Rot (Fresh Fruit)—Use 2 to 4 lbs. per 100 gals. of water. Immediately after harvest, immerse or spray fruit to give thorough wetting and allow to drain; do not immerse for more than 5 min. **Pineapple Butt Rot (Thielaviopsis paradoxa)**—Use 1¼ lbs. per 100 gals. of water as a preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

RICE (Except Calif.): Rice Blast, Stem Rot—Apply 1 to 2 lbs. per acre at booting and repeat at heading. Do not apply within 21 days of harvest. Do not apply to stubble rice. Do not apply to fields where crayfish or catfish farming is practiced, nor drain water from treated areas into areas where such farming is practiced. Water drained from treated areas must not be used to irrigate other crops.

SOYBEANS: Diaporthe Pod-and-Stem Blight, Anthracnose, Septoria Brown Spot, Cercospora Frogeye Leafspot, Purple Seed Stain—Apply ½ to 1 lb. per acre. For **determinate** varieties (generally grown in the South), apply at early pod set when majority of pods are ¼ to ¾" in length; for **indeterminate** varieties (generally grown in the North), apply when pods near the top of the plant are ½ to 1" in length. Make one additional application 14 to 21 days later. Do not apply within 35 days of harvest; do not graze or feed treated soybean vines or hay to livestock.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Treatment is most effective if applied just before rainfall; for aerial application, fly over every row or center.

EAST OF ROCKY MOUNTAINS—Use ¾ to 1½ lbs. per acre on trees up to 12' tall; over 12', use 1½ to 2 lbs. per acre.

Brown Rot Blossom Blight—Apply at early bloom stages (apricots—red bud; peaches, nectarines—pink bud; cherries—early popcorn; plums and prunes—green tip); for this application only, "Benlate" may be used in combination with spray oil. Make a second application at 75% to 100% bloom. If blossoming is prolonged or conditions favorable for disease persist, apply at petal fall.

Fruit Brown Rot—After blossom blight sprays, make two preharvest applications beginning 3 weeks before harvest up to day of harvest.

Peach Scab, Powdery Mildew—Use same schedule as for Brown Rot Blossom Blight plus applications at shuck split, shuck fall and 14 days later.

Cherry Leaf Spot—Use same schedule as for Brown Rot Blossom Blight and continue at 10- to 14-day intervals through harvest. Make an additional application 2 to 3 weeks after harvest.

STONE FRUITS—East of Rocky Mountains (continued)

WEST OF ROCKY MOUNTAINS—Use 1½ to 2 lbs. per acre.

Brown Rot Blossom Blight—Apply at early bloom stages (apricots—red bud; peaches, nectarines—pink bud; cherries—early popcorn; plums and prunes—green tip); for this application only, "Benlate" may be used in combination with [illegible] disease prolonged or conditions favorable for disease persist, make a second application 14 days later.

Fruit Brown Rot—After blossom blight sprays, make a preharvest application (before rain) any time from 3 weeks before harvest to day of harvest. Make a second application if conditions favorable for disease persist or harvest is prolonged. Preharvest applications are most effective when applied with ground equipment, using sufficient volume to provide thorough and uniform coverage of fruit.

Powdery Mildew—Use same schedule as for Brown Rot Blossom Blight plus applications at shuck split, shuck fall, and 14 days later.

Cherry Leaf Spot—Use same schedule as for Brown Rot Blossom Blight and continue at 10- to 14-day intervals through harvest. Make an additional application 2 to 3 weeks after harvest.

POSTHARVEST FRUIT ROTS (U.S.)—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. When wax is used, "Benlate" may be incorporated into the wax spray.

NOTE: "Benlate" does not control peach leaf curl, shot hole (*Coryneum blight*) or bacterial blast, nor fruit rots caused by *Rhizopus spp.* and *Alternaria spp.* Do not graze livestock in treated orchards.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. **Anthracnose**—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

Transplants: Botrytis Crown Rot, Leaf Spot—Use ½ lb. per 100 gals. of water. Immerse plants to give thorough wetting; remove and allow to drain.

SUGAR BEETS: Cercospora Leafspot—Apply ⅜ to ½ lb. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapply Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use ½ lb. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use ¼ lb. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

TOMATOES—Field and Greenhouse: Gray Mold (Botrytis), Leaf Mold (Cladosporium), White Mold (Sclerotinia), Cercospora Leafspot, Phoma Leafspot—For field tomatoes, apply ½ to 1 lb. per acre; for greenhouse, use ½ to 1 lb. per 100 gals. of water. Begin applications when disease first appears and repeat at 7- to 14-day intervals as needed.

ROSES, FLOWERS, ORNAMENTALS, SHADE TREES—Field and Greenhouse: Foliar Spray—Begin applications when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Use at the following rates: ½ lb. per 100 gals. (1 tablespoonful per 2 gals.)—for Powdery Mildew, Botrytis Gray Mold; 1 lb per 100 gals.—for Anthracnose (for shade trees and woody ornamentals, begin at bud break and make 2 or 3 additional applications at 10- to 14-day intervals); Black Spot of roses; Cercospora, Entomosporium, Ramularia, and Septoria Leafspots; Ascochyta and Phomopsis blights; Didymellina Leafspot of iris; Corynespora Leafspot of Ligustrum; Ovulinia Blight of azalea and rhododendron (begin as flowers open); Scab of pyracantha and flowering crab. Addition of a surfactant to the spray mixture improves distribution of the spray on hard-to-wet plants such as roses. For aerial application, use ½ to 1 lb. per acre.

Drench Treatment—Botrytis, Pusarium, Rhizoctonia and Sclerotinia stem, crown and root rots on herbaceous annuals, perennials and bedding plants; Cylindrocladium and Thielaviopsis rots on woody ornamentals such as azaleas, rhododendrons, conifers, and poinsettias—Use 1 lb. per 100 gals.; apply as a drench or heavy spray (1 to 2 pts. per sq. ft.) after transplanting into propagation beds or containers. Repeat at 2- to 4-week intervals during periods favorable for disease. "Benlate" does not control *Pythium spp.* or *Phytophthora spp.*

Preplant Dip Treatment—For diseases listed under Drench Treatment, use 1 lb. per 100 gals. of water; immerse plants or cuttings for 10 to 15 min.; remove and allow to drain.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1⅔ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER: Purchase of this material does not confer any rights under patents of countries outside of the United States.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feeds by storage or disposal.

STORAGE: Never allow "Benlate" to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container tightly closed when not in use.

PESTICIDE DISPOSAL: Pesticide, spray mixture or rinsate that cannot be used according to label instructions must be disposed of according to federal, state or local procedures under the Resource Conservation and Recovery Act.

CONTAINER DISPOSAL: Dispose of bags according to approved federal, state or local procedures under the Resource Conservation and Recovery Act.

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