

US EPA ARCHIVE DOCUMENT

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To: Rebecca Cool  
Product Manager 41  
Registration Support Branch (H7505C)

From: Anthony F. Maciorowski, Chief  
Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 93GA0006  
Chemical Name : Chlorothalonil  
Type Product : Fungicide  
Product Name : Bravo 720, Terranil 6L  
Company Name :  
Purpose : Emergency Exemption (Section 18) use on  
leafy greens (collard, kale, turnip, mustard).

Action Code : 510 Date Due : 3/10/93  
Reviewer : Tracy L. Perry

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur

P=Partial (Study partially fulfilled Guideline but additional information is needed)

S=Supplemental (Study provided useful information but Guideline was not satisfied)

N=Unacceptable (Study was rejected)/Nonconcur

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## Ecological Effects Branch Review

### Chlorothalonil

#### 100 Submission Purpose and Label Information

##### 100.1 Submission Purpose and Pesticide Use

The Georgia Department of Agriculture is requesting an emergency exemption under Section 18 of FIFRA for the use of chlorothalonil to control the leaf spot complex of diseases on leafy greens (mustards, collards, turnips, and kale) during the 1993 spring growing season. Chlorothalonil is already being used to protect the winter crop under a crisis exemption issued by the state on February 2, 1993.

##### 100.2 Formulation Information

###### Bravo 720/Terranil 6L

Active Ingredient:

Chlorothalonil (tetrachloroisophthalonitrile).....54.0%

Inert Ingredient:.....46.0%

(1 gallon contains 6 lbs. of chlorothalonil)

##### 100.3 Application Methods, Directions and Rates

One to 1 1/2 pints per acre (0.75 - 1.12 lbs ai/A) is to be applied in 80 to 100 gallons of water on a 7-10 day interval. Applications are to be made using ground equipment with a spray pattern designed to achieve good coverage of the foliage. A maximum of four ground applications (for a total of 4.5 lbs. a.i./A) per growing season is being requested to prevent disease development in leafy crops. A 14 day pre-harvest interval will be observed.

##### 100.4 Target Organisms

The leafspot complex of diseases: a) *Alternaria* leafspot, *Alternaria* sp.; b) Anthracnose, *Colletotrichum* sp.; c) *Cercospora* leaf spot, *Cercospora* sp.; d) pale spot, *Cercospora* sp.; and e) Downy mildew, *Peronospora*.

## **100.5 Precautionary Labeling**

### **Environmental Hazards**

#### **Bravo 720**

This product is toxic to fish, aquatic invertebrates, and marine/estuarine organisms. Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. **DO NOT** apply directly to water. **DO NOT** apply when weather conditions favor drift from treated areas. Apply only to areas specified on label.

#### **Terranil 6L**

This product is toxic to fish, aquatic invertebrates, and marine/estuarine organisms. Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not apply when weather conditions favor drift from treated areas. Apply only to areas specified on label. Do not contaminate water when disposing of equipment washwaters.

## **101 Hazard Assessment**

### **101.1 Discussion**

The State of Georgia is requesting an emergency exemption for the use of chlorothalonil to prevent leaf spot disease on leafy greens during the 1993 spring growing season (February 7 - June 30). This is the first year that an emergency exemption has been requested for this use. This Section 18 proposal calls for the treatment of approximately 14,500 acres of leafy greens grown state-wide with the major concentration in central and south Georgia.

Based on the maximum use rate of four applications (4.5 lbs. a.i./A total) on 14,500 acres, a total of 65,250 pounds (active ingredient) of chlorothalonil or 10,875 gallons of formulated product (Bravo 720/Terranil 6L) will be applied.

### **101.1 Likelihood of Adverse Effects on Nontarget Organisms**

The following toxicity data was excerpted from H. Mansfield's review on passion fruit, 10/28/92.

#### **Terrestrial**

##### **Avian Toxicity**

The available data indicate chlorothalonil is practically nontoxic to waterfowl on an acute oral basis (mallard LD<sub>50</sub> > 4640 mg/kg). The degradate, DS-3701 is considered to be moderately toxic (LD<sub>50</sub> = 158 mg/kg) to these organisms.

Chlorothalonil may be characterized as practically nontoxic to upland game birds and waterfowl on a subacute dietary basis (bobwhite and mallard  $LC_{50} > 10,000$  ppm).

Avian reproduction studies using technical chlorothalonil produced NOELs of 10,000 ppm and 1000 ppm in mallards and bobwhite quail, respectively. The degradate showed reproductive effects at lower concentrations; the NOELs/LOELs for mallards and bobwhite quail are 50/100 ppm and 100/250 ppm, respectively.

### Mammalian Toxicity

Chlorothalonil is practically nontoxic to mammals on an acute oral basis ( $LD_{50} = 10,000$  mg/kg for rats and 5,000 mg/kg for dogs). A rat reproduction study produced a NOEL of 15,000 ppm.

### Aquatic

#### Freshwater Organisms

Technical chlorothalonil is very highly toxic to both warmwater and coldwater fish on an acute basis ( $LC_{50} = 23$  g/L for fathead minnow, 43 g/L for catfish, and 47 g/L for rainbow trout). A 54% formulation (Bravo 720) is also very highly toxic to the bluegill ( $LC_{50} = 26$  ppb). The degradate can be characterized as slightly toxic to fish ( $LC_{50} = 16$  ppm for bluegill sunfish).

A fathead minnow life cycle study produced a NOEL of 3 ppb and a LOEL of 6.5 ppb.

This chemical is very highly toxic on an acute basis to freshwater invertebrates as well, with a *Daphnia magna*  $LC_{50} = 70$  g/L. A 54% formulation (Bravo 720) is also very highly toxic to *Daphnia magna* ( $EC_{50} = 97$  ppb). The degradate (DS-3701) is slightly toxic to invertebrates, with a *Daphnia magna*  $LC_{50} = 26$  ppm.

A *Daphnia magna* life cycle study produced a NOEL of 39 ppb and a LOEL of 79 ppb.

#### Marine/Estuarine Organisms

The available data indicate that chlorothalonil is very highly toxic to the estuarine/marine life ( $LC_{50} = 32$  ppb for sheepshead minnow, 3.6 ppb for oysters, and 165 ppb for shrimp).

### Plants

Nontarget terrestrial phytotoxicity tests show no significant

adverse effects on seed germination, seedling emergence and vegetative vigor at an application rate of 16 lbs ai/A.

Nontarget aquatic phytotoxicity tests with *Selenastrum capricornutum* produced an  $EC_{50}$  of 190 ppb.

#### Environmental Fate Data

The following environmental fate data was excerpted from an earlier EEB review (D. Rieder 8/13/91):

Chlorothalonil degrades at a moderate rate in most soils, with a half-life of less than 30 days. Lack of moisture tends to slow down the degradation process. Rate of breakdown increases as the temperature rises from 21°C to 39°C. Aged chlorothalonil is slightly mobile to mobile in most soils.

DS-3701, the major degradate of chlorothalonil, is extremely persistent with no dissipation observed within 90 days. The degradate also leaches in many types of soil.

Chlorothalonil is stable to hydrolysis for 30 days at pH 5 and 7. At pH 9, 10% will degrade to 2,4,5,6-tetrachloroisophthalamide in 30 days. The half-life in flooded sandy loam (sediment) was 5-15 days.

Water solubility is 6 ppm.

DS-3701 is stable to hydrolysis.

Both chlorothalonil and DS-3701 are stable to photodegradation on surfaces.

Based on information from crop residue studies, the value of 7.5% will be used to estimate exposure levels of the degradate.

The bioconcentration of chlorothalonil in bluegill sunfish plateaus at 60 to 200x in edible tissue and 900 to 3000x in nonedible tissues. DS-3701 bioconcentration in bluegill plateaus at 50x in edible tissue and 250x in nonedible tissues. Residues of both parent and degradate declined to less than 50% after 7 to 10 days in clean water.

#### RESIDUES AND RISK ASSESSMENT

##### Effects on Terrestrial Organisms

###### A. Avian

Using the Kenaga nomograph, the following terrestrial residues are expected based on a single application of 1.12 lbs a.i./acre

(maximum rate):

SHORT RANGE GRASS	LONG RANGE GRASS	LEAVES	FORAGE	PODS, SEEDS, & INSECTS	FRUIT
269 ppm	123 ppm	140 ppm	65 ppm	13 ppm	8 ppm

As the degradate is estimated to be 7.5% of the parent compound, the following residues of DS-3701 are expected from a single maximum application:

SHORT RANGE GRASS	LONG RANGE GRASS	LEAVES	FORAGE	PODS, SEEDS, & INSECTS	FRUIT
20 ppm	9 ppm	10 ppm	5 ppm	1 ppm	.6 ppm

According to the above tables, the expected residues on terrestrial food items of the parent or the degradate should not pose a hazard to nontarget avian species on an acute basis.

Chlorothalonil can be applied a maximum of four times at a 7 day interval under the proposed Section 18. To account for multiple applications, the EPA Fate computer program was employed (see Attachments A,B). As the calculated EECs for technical chlorothalonil and its degradate do not surpass the reproductive LOELs for either the bobwhite or the mallard, chronic hazard to birds is not expected from the proposed emergency exemption use.

#### B. Mammalian

Chlorothalonil is practically nontoxic to mammals on an acute oral basis (rat LD<sub>50</sub> = 10000 mg/kg). A rat reproduction study produced a NOEL of 15,000 ppm.

The exposure is expected to be well below the NOEL of 15,000 ppm reported for the rat 90-day-chronic feeding study. Therefore, the parent compound does not raise concern for mammalian species.

#### C. Aquatic

To assess potential hazard to aquatic organisms, an aquatic EEC was calculated from runoff originating from a 10 acre leafy green field and emptying into a 6 foot, 1 acre pond (Attachment C). This value (13.7 ppb) was used as the initial concentration in EEB's "Fate" program (Attachment D).

The result of this computer run shows that with a half-life of 30 days and a maximum of four applications at 7 day intervals, the EEC would be expected to reach a level of 43.7 ppb after 21 days. This value exceeds the restricted use trigger ( $1/10 LC_{50}$ ) for nontarget freshwater fish and aquatic invertebrates and exceeds the chronic effect level (LOEL) for the fathead minnow. In addition, acute hazards for both endangered fish and aquatic invertebrates are triggered ( $EEC > 1/20 LC_{50}$ ).

Based on the above, the proposed use of chlorothalonil may result in hazard to aquatic organisms (endangered and nonendangered) in bodies of water near treatment sites.

#### D. Plants

No significant adverse effects on seed germination, seedling emergence and vegetative vigor of terrestrial plants were observed at an application rate of 16 lbs ai/A (the application rate for the proposed use is 1.12 lbs ai/A). As the aquatic EEC of 43.7 ppb does not exceed the  $EC_{50}$  of 190 ppb for *Selenastrum capricornutum*, adverse effects to freshwater green algae are not expected. Therefore, adverse effects to nontarget aquatic or terrestrial plant species are not expected from the proposed use.

#### 101.3 Endangered Species Considerations:

According to information in EEB's Endangered Species files, there are five federally listed fish species (snail darter, yellowfin madtom, spotfin chub, amber darter and shortnose sturgeon) which occur in counties (Catoosa, Dawson and Tattnall) where chlorothalonil may be applied.

While collards and turnip greens are grown in Catoosa and Dawson counties, production is mainly limited to small home gardens as the terrain is not suited to large-scale agriculture (see Attachment E). In addition, the total acreage in production is minimal in these counties (Census of Agriculture, 1987). Therefore, the listed species which occur there (snail darter, yellowfin madtom, spotfin chub, amber darter) are not expected to be adversely impacted by the proposed emergency exemption use.

The shortnose sturgeon occurs in the Altamaha River of Tattnall county. Adverse effects to this species is not expected as the river is quite large and swift (see Attachment E); any chlorothalonil reaching the river is expected to be quickly diluted to nontoxic concentrations. In addition, the acreage of leafy greens in production is minimal in this county (Census of Agriculture, 1987).

Based on the above information, no endangered species are expected



to be adversely affected from this Section 18 emergency exemption use.

**101.4 Adequacy of Toxicity Data:**

Toxicity data are sufficient to assess hazards to nontarget terrestrial and aquatic organisms under this Section 18 proposal.

**101.5 Adequacy of Labeling:**

The following environmental hazard labeling should be required: This pesticide is toxic to fish and aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Runoff may be hazardous to organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters or rinsate.

**103 Conclusions:**

EEB has reviewed the proposed emergency exemption for the use of chlorothalonil on leafy greens in Georgia. EEB concludes that the proposed use of chlorthalonil may result in potential acute and chronic risk to nontarget fish and aquatic invertebrates, although risk to endangered aquatic species is expected to be minimal (see Section 101.3). Ground application and the limited acreage involved should help minimize risk to these organisms.

Tracy L. Perry, Wildlife Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7507C)

*Tracy L. Perry* 2/26/93

Henry T. Craven, Head, Section IV  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7507C)

*Henry T. Craven* 3/1/93

Anthony F. Maciorowski, Chief  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7507C)

*Anthony F. Maciorowski* 3/2/93

## "DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL."

"Chemical name -----	", "CHLOROTHALONIL"
"Initial concentration (ppm) -----	", 269
"Half-life -----	", 30 days
"A number of application -----	", 4
"Application interval -----	", 7 days
"Length of simulation (day) -----	", 30 days

## "DAY", "RESIDUE (PPM)"

" 0 "	", 269
1,	262.856
2,	256.8524
3,	250.9859
4,	245.2534
5,	239.6518
6,	234.1781
7,	497.8295
8,	486.459
9,	475.3483
10,	464.4913
11,	453.8823
12,	443.5157
13,	433.3857
14,	692.4872
15,	676.6707
16,	661.2156
17,	646.1133
18,	631.3561
19,	616.936
20,	602.8451
21,	858.0761
22,	838.4776
23,	819.3268
24,	800.6133
25,	782.3273
26,	764.4589
27,	746.9987
28,	729.9371
29,	713.2653
30,	696.9744
"Maximum residue -----	", 858.0761
"Average residue -----	", 557.799

# ATTACHMENT B

## "DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL."

"Chemical name -----	", "CHLOROTHALONIL" DEGRADATE
"Initial concentration (ppm) -----	", 20
"Half-life -----	", 30 days
"A number of application -----	", 4
"Application interval -----	", 7 days
"Length of simulation (day) -----	", 30 days

## "DAY", "RESIDUE (PPM)"

" 0 ", 20	
1, 19.5432	
2, 19.09683	
3, 18.66066	
4, 18.23445	
5, 17.81797	
6, 17.41101	
7, 37.01335	
8, 36.16796	
9, 35.34188	
10, 34.53467	
11, 33.7459	
12, 32.97514	
13, 32.22199	
14, 51.48604	
15, 50.3101	
16, 49.16101	
17, 48.03817	
18, 46.94098	
19, 45.86885	
20, 44.8212	
21, 63.79748	
22, 62.34034	
23, 60.91649	
24, 59.52515	
25, 58.1656	
26, 56.8371	
27, 55.53893	
28, 54.27043	
29, 53.03089	
30, 51.81966	
"Maximum residue -----	", 63.79748
"Average residue -----	", 41.47204

## ATTACHMENT C

### EEC CALCULATION SHEET

For an unincorporated ground application of Bravo 720 or Terranil 6L at a rate of 1.12 lbs a.i./A to leafy green fields:

#### Runoff

$$\begin{array}{ccccccc} \underline{1.12} \text{ lbs} & \times & \frac{0.02}{(2\% \text{ runoff})} & \times & \frac{10 \text{ (A)}}{(10 \text{ A drainage})} & = & \frac{0.22 \text{ lbs}}{(\text{tot.runoff})} \end{array}$$

EEC of 1 lb a.i. direct application to a 1 acre pond 6 feet deep = 61 ppb.

Therefore, EEC = 61 ppb  $\times$  0.22 lbs = 13.7 ppb

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# ATTACHMENT D

## "DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL."

"Chemical name -----	", "CHLOROTHALONIL"
"Initial concentration (ppb) -----	", 13.7
"Half-life -----	", 30 days
"A number of application -----	", 4
"Application interval -----	", 7 days
"Length of simulation (day) -----	", 30 days

## "DAY", "RESIDUE (PPM)"

" 0 "	", 13.7
1,	13.38709
2,	13.08133
3,	12.78255
4,	12.4906
5,	12.20531
6,	11.92654
7,	25.35414
8,	24.77505
9,	24.20919
10,	23.65625
11,	23.11594
12,	22.58797
13,	22.07206
14,	35.26793
15,	34.46242
16,	33.67529
17,	32.90614
18,	32.15457
19,	31.42016
20,	30.70252
21,	43.70128
22,	42.70314
23,	41.72779
24,	40.77473
25,	39.84343
26,	38.93341
27,	38.04417
28,	37.17524
29,	36.32615
30,	35.49647
"Maximum residue -----	", 43.70128
"Average residue -----	", 28.40835

## ATTACHMENT E

Ron Larson, Fish and Wildlife Biologist  
Division of Ecological Services, USFWS  
Brunswick, Georgia  
(912) 265-9336

On February 25, 1993, I had a telephone conversation with Ron Larson concerning the endangered/threatened fish species in the counties of Catoosa, Dawson and Tattnall. He provided the following information:

Catoosa - Ron stated that two additional threatened species (yellowfin madtom and spotfin chub) occur in this county. EEB only has record of one endangered species (snail darter). He said that leafy greens are mainly grown in small home gardens as the terrain is rather mountainous and not suited to large-scale agriculture.

Dawson - The amber darter occurs in the Etowah River. The same situation exists for this county as Catoosa in that leafy greens are mainly grown in small home gardens.

Tattnall - The shortnose sturgeon occurs in the Altamaha River which is a fairly large river and swift moving (especially in the spring). Ron agreed that any runoff of chlordane into the river would probably not be a problem due to the dilution factor.

SUPPLEMENTAL LABELING  
FOR DISTRIBUTION AND USE ONLY  
WITHIN GEORGIA

BRAVO 720, EPA REG. NO. 50534-188  
TERRANIL 6L, EPA REG. NO. 9779-320

FOR USE ONLY ON LEAFY GREENS (COLLARDS, MUSTARDS, TURNIPS AND KALE) IN GEORGIA PURSUANT TO THE APPROVED TERMS OF EMERGENCY EXEMPTION UNDER SECTION 18 OF THE FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT AS AMENDED. APPLICATION OF CHLOROTHALONIL IS PERMITTED FROM THE TIME OF APPROVAL THROUGH JUNE 30, 1993. ANY USE AFTER THAT DATE IS ILLEGAL AND MAY RESULT IN PROSECUTION.

All applicable directions, restrictions, precautions and Conditions of Sale and Warranty of the EPA registered label are to be followed. This labeling must be in the possession of the user at the time of application.

**DIRECTIONS FOR USE**

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

Target Pests: Chlorothalonil may be used to control the leafspot disease complex (Alternaria, Cercospora, Cercospora, Anthracnose and downy mildew).

Rate of application: Apply 1 to 1 1/2 pints per acre in 80 to 100 gallons of water.

Method of application: Apply with ground equipment in sufficient water to thoroughly cover all leaf surfaces at 7 to 10 day intervals at first symptoms of disease development

Preharvest interval: Do not apply within 14 days of harvest.

Additional Precautionary Information:

- o Mixer-loaders and applicators must wear protective clothing to include goggles or face shield, long sleeve shirt, long pants and gloves.

**ATTENTION:** Records are required of all use under this emergency exemption. This record should include number of applications, rate of application, approximate location of the crops to which applied, number of acres and name and address of farmer. This information is to be reported to the Georgia Cooperative Extension Service (your county agent).

ACCEPTED  
with COMMENTS  
In EPA Letter Dated:

AUG 18 1992

R®

TERRANIL 6L

Flowable agricultural fungicide

Under the Federal Insecticide  
Fungicide, and Rodenticide Act  
as amended, for the pesticide  
registered under EPA Reg. No.

9779-320

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ACTIVE INGREDIENT

Chlorothalonil (tetrachloroisophthalonitrile)..... 54.0%

INERT INGREDIENTS..... 46.0%

Total 100.0%

Contains 6 pounds chlorothalonil per gallon.

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STOP-READ LABEL BEFORE USING.

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KEEP OUT OF REACH OF CHILDREN

WARNING/AVISO

PRECAUCION AL USUARIO: Si usted no lee ingles, no use este  
producto hasta que la etiqueta le haya sido explicada ampliamente.

STATEMENT OF PRACTICAL TREATMENT

IF INHALED: Remove victim to fresh air. If not breathing, give artificial  
respiration, preferably mouth-to-mouth. Get medical attention.

IF IN EYES: Flush with plenty of water. Call a physician.

IF SWALLOWED: Drink promptly a large quantity of milk, egg whites, gelatin  
solution, or, if these are not available, drink large quantities of water.  
Avoid alcohol.

IF ON SKIN: Wash with plenty of soap and water. Get medical attention.

FIRST AID: Note to Physician: Persons having an allergic reaction respond to  
treatment with antihistamines or steroid creams and/or systemic steroids.

See additional PRECAUTIONARY STATEMENTS on side panel.

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EPA Reg. No. 9779-320

EPA Est. No. 9779-AR-13

Manufactured For

RIVERSIDE/TERRA CORPORATION

Terra Centre, 600 Fourth Street, Sioux City, Iowa 51101

Riverside Serves Agriculture. Agriculture Serves Everyone.

NET CONTENTS  
2 1/2 GALS.



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PRECAUTIONARY STATEMENTS  
WARNING  
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Causes substantial but temporary eye injury. May be fatal if inhaled. Harmful if absorbed through skin. Avoid contact with skin, eyes, or clothing. Wear goggles, face shield, or safety glasses. Harmful if swallowed.

Do not breathe vapor or spray mist. Wear a mask or pesticide respirator jointly approved by the MESA and NIOSH. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

ENVIRONMENTAL HAZARDS

This product is toxic to fish, aquatic invertebrates, and marine/estuarine organisms. Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not apply when weather conditions favor drift from treated areas. Apply only to areas specified on the label. Do not contaminate water when disposing of equipment washwaters.

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DIRECTIONS FOR USE

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

RE-ENTRY STATEMENT

Do not apply this product in such a manner as to directly, or through drift, expose workers or other persons. The area being treated must be vacated by unprotected persons. Do not enter treated area to perform hand labor within 24 hours of application unless protective clothing is worn. NOTE TO USER: Wear long sleeve shirt, long pants, and gloves while mixing, loading and applying this product. Because certain states may require more restrictive re-entry intervals for various crops treated with this product, consult your State Department of Agriculture for further information.

NOTICE TO CROP OWNERS

Written or oral warnings must be given to workers who are expected to be in a treated area or in an area about to be treated with this product. When oral warnings are given, warnings shall be given in a language customarily understood by workers. Oral warnings must be given if there is reason to believe that written warnings cannot be understood by workers. Oral and written warnings must include the following information: WARNING. Area treated with chlorothalonil on (date of application). Do not enter without appropriate protective clothing for 24 hours. In case of accidental exposure, wash exposed area with plenty of water and get medical attention. For further information see PRECAUTIONARY STATEMENTS on the label.

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STORAGE AND DISPOSAL  
DO NOT CONTAMINATE WATER, FOOD, OR FEED BY STORAGE OR DISPOSAL

STORAGE

Store in a cool place. Protect from excessive heat.

DISPOSAL

PESTICIDE DISPOSAL: Pesticide wastes are toxic. Improper disposal of excess pesticide, pesticide spray, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Do not reuse empty container. Triple rinse or equivalent. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

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GENERAL INFORMATION

Terranil 6L is an excellent fungicide when used according to label directions for control of a broad spectrum of plant diseases. Terranil 6L can be used effectively in dilute or concentrate sprays. Thorough, uniform coverage is essential for disease control. Do not combine Terranil 6L in the spray tank with pesticides, surfactants or fertilizers, unless prior use has shown the combination physically compatible, effective and noninjurious your conditions of use.

Do not combine Terranil 6L with Dipel 4L, Triton AG-98, or Triton B-1956 as phytotoxicity may result from the combination when applied to some crops on this label. Dipel is a registered trademark of Abbott Laboratories. Triton and Triton B-1956 are trademarks of Rohm & Haas Company.

Slowly invert container several times to assure uniform mixture. The required amount of Terranil 6L should be added slowly into the spray tank during filling. With concentrate sprays, pre-mix the required amount of Terranil 6L in a clean container and add to the spray tank as it is being filled. Keep agitator running when filling spray tank and during spray operations. Do not use on greenhouse grown crops.

Dosage rates on this label indicate pints of Terranil 6L per acre unless otherwise stated. Under conditions favoring disease development, the high rate specified and shortest application interval should be used. Applications should be made in sufficient water to obtain adequate coverage of foliage. Gallonage to be used will vary with crop and amount of plant growth. Spray volume usually will range from 20 to 150 gallons (approximately 80 to 600 liters) per acre for dilute sprays and 5 to 10 gallons (approximately 20 to 40 liters) per acre for concentrate ground sprays and aircraft applications. Both ground and aircraft methods of application are recommended unless specific directions for ground application only are given for a crop. Application through sprinkler irrigation systems is not recommended unless specific directions are given for a crop. See application and calibration instructions below.

## APPLICATION AND CALIBRATION TECHNIQUES FOR SPRINKLER IRRIGATION

Apply this product only through the following types of irrigation systems. Do not apply this product through any other type of irrigation system. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from nonuniform distribution of treated water. If you have questions about calibration, you should contact State Experiment Station specialists, equipment manufacturers, or other experts. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

A. Center Pivot, Traveler, Big Gun, Motorized Lateral Move, End Tow, and Side (Wheel) Roll Irrigation Equipment: Operate system and injection equipment at normal pressures recommended by the manufacturer of injection equipment used. Fill tank of injection equipment with water. Operate system for one complete circle for center pivot or one complete run for the other recommended equipment, measuring time required, amount of water injected, and acreage contained in circle or run. Mix recommended amount of Terranil 6L for acreage to be covered into same amount of water used during calibration and inject into system continuously for one revolution or run, but continue to operate irrigation system until Terranil 6L has been cleared from last sprinkler head. Spray mixture in the chemical supply tank must be agitated at all times, otherwise settling and uneven application may occur.

B. Solid Set and Hand Move Irrigation Equipment: Determine acreage covered by sprinkler. Fill tank of injection equipment with water and adjust flow to use contents over a thirty to forty-five minute period. Mix desired amount of Terranil 6L for acreage to be covered into quantity of water used during calibration and operate entire system at normal pressures recommended by the manufacturer of injection equipment used for amount of time established during calibration. Provide constant mechanical agitation in the mix tank to insure that Terranil 6L will remain in suspension during the injection cycle. Terranil 6L can be injected at the beginning or end of the irrigation cycle or as a separate application. Stop injection equipment after treatment is completed and continue to operate irrigation system until the product is cleared from last sprinkler head.

### SAFETY DEVICES

(1) The systems designated above must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow. (2) All pesticide injection pipelines must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump. (3) The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down. (4) The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.

(5) The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected. (6) Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock. (7) Do not apply when wind speed favors drift beyond the area intended for treatment.

#### SYSTEMS CONNECTED TO PUBLIC WATER SOURCES

Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.

Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone, backflow preventer (RPZ) or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.

For additional instructions on safety precautions, refer to statements (2),(3), (4),(6), and (7) in the section on SAFETY DEVICES.

CROP	DISEASES	RATE PER ACRE	APPLICATION DIRECTIONS
Bean (Snap)	Rust	1 3/8 to 3 pints	Use in sufficient water to obtain adequate coverage. Begin applications during early bloom stage or when disease first threatens and repeat at weekly intervals or as necessary to maintain control. Do not apply within 7 days of harvest. Do not graze treated areas or feed treated plant parts to livestock.
	Botrytis Blight (gray mold)	3 pints	
Beans (Dry) Navy, Pinto, Kidney, Lima, Blackeye	Rust, Anthracnose, Downy mildew, Cercospora leaf spot (blackeye only)	1 3/8 to 2 pints	Use in sufficient water to obtain adequate coverage. Begin applications during early bloom stage and repeat at 7 to 10 day intervals. For use only on beans harvested dry with pods removed. Do not apply within 6 weeks before harvest. Do not allow livestock to graze in treated areas or feed treated plant parts to livestock.
Cabbage, Chinese cabbage (tight-headed varieties only) Cauliflower Broccoli Chinese Broccoli Brussels sprouts	Alternaria leaf spot, Downy mildew	1 1/2 pints	Use in sufficient water to obtain adequate coverage. Begin applications after transplants are set in field, or shortly after emergence of field-seeded crop, or when conditions favor disease development. Repeat at 7 to 10 day intervals or as necessary to maintain control. Do not apply within 7 days of harvest to Chinese cabbage or Chinese broccoli.
	Ring spot (California only)	2 pints	For field-seeded Brussels sprouts, begin applications at time of early sprout development or when conditions favor disease development. Repeat at 7 to 10 day intervals or as necessary to maintain control.
Carrot	Cercospora (Early) blight, Alternaria (Late) blight	1 1/2 to 2 pints	Use in sufficient water to obtain adequate coverage. Start applications when disease threatens and repeat at 7 to 10 day intervals or as necessary to maintain control. Terranil 6L may be applied through sprinkler irrigation equipment (solid set, portable wheel move, motorized lateral move, or center pivot systems only). See calibration directions preceding this section.
Celery	Cercospora (Early) blight, pints Septoria (Late) blight OR Basal stalk rot 2 to 3 pints (Rhizoctonia solani) Pink rot 3 pints (Suppression- 7 day schedule)	1 to 1 1/2 pints	Use 1 to 1-1/2 pints per acre on a 3 to 5 day spray schedule or 2 to 3 pints per acre on a 7 day schedule. Start applications when transplants are set in the field. Apply in sufficient water to obtain adequate coverage. Terranil 6L may be applied through sprinkler irrigation equipment (solid set, portable wheel move, motorized lateral move, or center pivot systems only). See calibration directions preceding this section. Do not apply within 7 days of harvest.
	Early blight Late blight	1 1/2 to 2 pints/100 gal.	For celery seedbeds, apply 125 gallons per acre twice weekly or as needed to maintain control. Start applications shortly after crop emergence. Use the higher rate under severe disease conditions.

CROP	DISEASES	RATE PER ACRE	APPLICATION DIRECTIONS
Corn (Sweet), Corn grown for seed	Helminthosporium leaf blights, Rust	3/4 to 2 pints	Use in sufficient water to obtain adequate coverage. Begin applications when conditions favor disease development and repeat at 4 to 7 day intervals or as required to maintain control. Under severe disease conditions, use 1 1/2 to 2 pints per acre. Do not apply within 14 days of harvest. Do not apply to sweet corn to be processed. Do not allow livestock to graze in treated fields. Do not ensile treated corn or use as livestock forage.
Cranberry	Fruit rots, Lophodermium leaf-twig blight	4 to 7 pints	Apply at early bloom and repeat at 10 to 14 day intervals. Under severe disease conditions, use the 7 pints/acre rate on a 10 day schedule. Do not apply more than 3 times per season, or within 50 days before harvest. Do not apply to bogs when flooded or allow release of irrigation water from bogs for at least 3 days following application. Terranil 6L may be applied through sprinkler irrigation equipment. Use 300 gallons of water per acre through solid set systems only. See calibration directions preceding this section.
Cucurbits: Cucumber, Cantaloupe, Muskmelon, Honeydew, Watermelon, Squash, Pumpkin	Anthracnose, Downy mildew Target spot Cercospora leaf- spot, Gummy stem blight (black rot), Alternaria leaf blight, Scab, Powdery mildew (Spaerotheca only)	1 1/2 to 2 pints 2 to 3 pints	Use in sufficient water to obtain adequate coverage. Begin application when plants are in first true leaf stage or when conditions are favorable for disease development. Repeat applications at 7 day intervals. Under severe disease conditions, shorten spray interval. Terranil 6L may be applied through sprinkler irrigation equipment (solid set, portable wheel move, or center pivot systems only). See calibration directions preceding this section. PRECAUTION: Certain varieties of melons may be sensitive to sunburn following applications of chlorothalonil during periods of high solar intensity.
	Cucumber belly rot (Rhizoctonia solani)	8 1/4 pints	Use in sufficient water to obtain runoff to soil surface. Make a single application when vines begin to form. Terranil 6L may be applied through sprinkler irrigation equipment as directed above.
Grasses grown for seed	Stem rust, Leaf rust, Stripe rust, Septoria leafspot, Glume blotch, Bipolaris, Drechslera leaf- spots Selenophoma (eyespot)	1 to 1 1/2 pints 1 to 2 pints	Use in sufficient water to obtain adequate coverage. Begin applications during stem elongation when conditions favor disease development. Re-apply at flag (top) leaf emergence and repeat applications at 14-day intervals. Do not apply within 14 days of harvest. Do not allow livestock to graze in treated areas or feed treated plant parts to livestock.

CROP	DISEASES	RATE PER ACRE	APPLICATION DIRECTIONS												
Mint	Rust, Septoria leaf spot	1 3/8 pints	Use in sufficient water to obtain adequate coverage, normally 20 to 150 gallons per acre for dilute sprays and 5 to 10 gallons per acre for concentrate ground and aircraft applications. Begin applications when emerging plants are 4-8 inches high. Repeat applications at 7 to 10 day intervals or as necessary to maintain control. Do not apply more than 3 times per season. Do not apply within 80 days of harvest. Do not feed fresh or extracted mint hay from treated fields to livestock. Based on available residue data, use of Terranil 6L on mint is restricted to Indiana, Michigan and Wisconsin.												
Onion (dry bulb)	Botrytis leaf blight (blast), Botrytis neck rot (suppression), Purple blotch	1 to 2 pints	<p>Apply in sufficient water to obtain adequate coverage of tops. Terranil 6L is recommended for use with disease monitoring systems which adjust fungicide rates and frequency of application according to disease hazard. Apply as follows:</p> <table> <tr> <td></td><td>Low Disease Hazard &amp; Prior to Infection</td><td>Low Disease Hazard &amp; Some Disease Present</td><td>High Disease Hazard</td></tr> <tr> <td>Rate per Acre:</td><td>1 pt.</td><td>1 3/8 pts.</td><td>2 pts.</td></tr> <tr> <td>Frequency:</td><td>10 days</td><td>7 to 10 days</td><td>7 days</td></tr> </table> <p>For suppression of neck rot (Botrytis spp.) during storage, a minimum of three weekly applications prior to lifting, using 1 3/8 to 2 pints of Terranil 6L per acre, is recommended. Do not apply within 7 days of harvest.</p>		Low Disease Hazard & Prior to Infection	Low Disease Hazard & Some Disease Present	High Disease Hazard	Rate per Acre:	1 pt.	1 3/8 pts.	2 pts.	Frequency:	10 days	7 to 10 days	7 days
	Low Disease Hazard & Prior to Infection	Low Disease Hazard & Some Disease Present	High Disease Hazard												
Rate per Acre:	1 pt.	1 3/8 pts.	2 pts.												
Frequency:	10 days	7 to 10 days	7 days												
Onion (green bunching), Garlic, Leek, Shallot, Onion grown for seed	Botrytis leaf blight (blast), Purple blotch, Downy mildew (suppression)	1 1/2 to 3 pints	Use in sufficient water to obtain thorough coverage of tops. Begin applications prior to favorable infection periods, and repeat at 7 to 10 day intervals for as long as conditions favor disease. Use the high rate and a 7 day schedule of applications when heavy dew or rain persist. Do not apply within 7 days of harvest on garlic. Do not apply more than 3 times per season or within 14 days of harvest on green bunching onions, leeks or shallots. If additional disease control is needed before harvest, use another registered fungicide.												
Papaya	Alternaria fruit spot, Anthracnose, Stem end rot	2 to 4 pints	Apply with ground equipment only, in sufficient water to obtain adequate coverage of fruit and leaves. Begin treatment when conditions favor development of disease and continue treatments at 14 day intervals until weather conditions no longer favor disease development. Do not graze livestock in treated area or feed processing by-products to livestock.												

CROP	DISEASES	RATE PER ACRE	APPLICATION DIRECTIONS
Soybean Indeterminate (Northern) Varieties	Anthracnose, Diaporthe pod and stem blight, Frogeye leaf spot (Cercospora soja)		Apply in sufficient water to obtain complete coverage, using at least five gallons of water per acre for aerial application. Use the three application program in areas having a history of moderate to severe disease intensity. Terranil 6L may be applied through sprinkler irrigation equipment. Follow application and calibration directions preceding this section. NOTE: Do not exceed total of 3 applications per season. Do not apply within 6 weeks of harvest. Do not feed soybean hay or threshings from treated fields to livestock.
	Purple seed stain, Cercospora leaf blight, (Cercospora kikuchii), Septoria brown spot	1 1/2 to 2 1/2 pints	Two application program - Make the first application when the largest pods are 1 to 1 1/2 inches in length and make the second application 14 days later. Terranil 6L may be coapplied with Benomyl 50WP as a tank mix for disease control in indeterminate (northern) soybeans. Use 1 pint of Terranil 6L plus 8 ounces of Benomyl 50WP per acre. Make the first application when pods near the top of plants are 1/2 to 1 inch in length and a second application 14 days later.
		1 to 2 pints	Three application program - Make the first application one week after first flowering and continue applications at 14 day intervals.
Tomato	FOLIAGE: (apply every 7 to 10 days): Early blight, Late blight, Gray leaf spot, Gray leaf mold, Septoria leaf spot Target spot	1 3/8 to 2 pints	Apply in sufficient water to obtain adequate coverage. Begin applications when dew or rain occur and disease threatens. Use the highest rate and shortest interval specified when disease conditions are severe. Terranil 6L may be combined in the spray tank with EPA-registered pesticide products that claim copper as the active ingredient and are labeled for control of bacterial diseases of tomatoes. Check the copper manufacturer's label for specific instructions, precautions and limitations prior to mixing with Terranil 6L. Do not use with Copper-Count N* in concentrated spray suspensions. Terranil 6L may be applied through sprinkler irrigation equipment (solid set or portable wheel line systems only). See calibration directions preceding this section.
	FRUIT: (apply every 7 to 14 days beginning at fruit set): Anthracnose, Alternaria fruit rot (black mold), Rhizoctonia fruit rot, Botrytis gray mold, Late blight fruit rot	2 to 3 pints	



CROP	DISEASES	RATE PER ACRE	APPLICATION DIRECTIONS
Parsnip	Alternaria leaf spot, Downy mildew, Anthracnose, Botrytis blight (gray mold), Bottom rot (Rhizoctonia)	1 1/2 to 2 pints	Apply in sufficient water to obtain adequate coverage. Make the first application at the first sign of disease or when conditions are favorable for infection. Continue applications on a 7 to 10 day schedule. Do not apply more than 4 times per season or within 10 days of harvest. Do not feed treated plant parts to livestock.
Passion Fruit (Hawaii only)	Alternaria fruit and leaf spot (passion fruit brown spot)	2 pints	Apply with ground equipment in sufficient water to obtain adequate coverage of fruit and leaves. Begin treatment when fruit spots appear (April to July) and continue treatments at 14 day intervals until weather conditions no longer favor disease development. Do not graze in treated area or feed vines or processing by-product to livestock used for food.
Peanut	Cercospora (early) leaf-spot,	1 to 1 1/2 pints	Apply in sufficient water for coverage when leaf wetness first occurs or 30 to 40 days after planting. Repeat at 10 to 14 day intervals. When conditions favor late leaf spot or when rust or web blotch occur, apply 1 1/2 pints per acre at 10 day intervals for the remainder of the season. Do not apply within 14 days of harvest. Do not allow livestock to graze in treated areas. Do not feed hay or threshings from treated fields to livestock. Terranil 6L may be applied through sprinkler irrigation equipment. Use 1 1/2 pints per acre in solid set, portable wheel move, center pivot, motorized lateral move, or traveling gun sprinkler irrigation equipment. See calibration directions preceding this section.
	Cercosporidium (late) leafspot Rust, Web blotch	1 1/2 pints	
Potato	Early blight, Late blight Botrytis vine rot	3/4 pint -then- 1 to 1 1/2 pints	Apply as a banded treatment directed over the foliage, beginning when vines are first exposed and leaf wetness occurs. Repeat applications at 7 to 10 day intervals until vines close, then increase rate as described below. In addition to the early-season applications above, as vines close between rows increase water carrier volume to cover the denser canopy and begin broadcast application patterns. Continue applications at 7 to 10 day intervals. Use the highest registered rate weekly when disease conditions are severe. Terranil 6L may be applied through sprinkler irrigation equipment (solid set, portable wheel move, center pivot, or motorized lateral move systems only). Do not exceed a 10 day interval between applications when using this technique. Follow calibration and application directions preceding this section.

CROP	DISEASES	RATE PER ACRE	APPLICATION DIRECTIONS
Soybean Determinate (Southern) Varieties	Anthracnose, Diaporthe pod and stem blight, Frogeye leaf spot ( <i>Cercospora sojina</i> )		Apply in sufficient water to obtain complete coverage, using at least five gallons water per acre for aerial application. Use the three application program in areas having a history of moderate to severe disease intensity. Terranil 6L may be applied through sprinkler irrigation equipment. Follow application and calibration directions preceding this section. NOTE: Do not exceed total of 3 applications per season. Do not apply within 6 weeks of harvest. Do not feed treated parts to livestock or allow grazing in treated fields.
	Purple seed stain, <i>Cercospora</i> leaf blight ( <i>Cercospora kikuchii</i> ),	1 1/2 to 2 1/2 pints	Two application program - Make the first application at early pod set (R3 stage, when majority of pods are 1/8 to 3/8 inch in length) and the second at beginning of seed formation (R5) which occurs about 14 days later.
	Septoria brown spot	1 to 2 pints	Three application program - Make the first application at the beginning of flowering (R1), the second at early pod (R3) and the third at beginning of seed formation (R5).
	Stem canker ( <i>Diaporthe phaseolorum</i> var. <i>caulivora</i> )	1 pint	Apply in 10 to 20 gallons of water per acre, as a band treatment directing spray to provide coverage of entire plant. Make the first application at time of emergence of the second trifoliate leaves (V2). If conditions favor stem canker disease make a second and a third application. Make all applications at 10 to 14 day intervals.

# TREE AND ORCHARD CROPS

Apply Terranil 6L in sufficient water and with proper calibration to obtain uniform coverage of tree canopy. Application with ground equipment is preferable to aerial application because ground applications generally give better coverage of the tree canopy. If application with ground equipment is not feasible, Terranil 6L may be applied with aircraft using at least 20 gallons per acre. When concentrate sprays are used or when treating non-bearing or immature trees, the lower rate of Terranil 6L listed may be used. Do not allow livestock to graze in treated areas. The following spray volumes are recommended as gallons of spray per acre:

CROP	SPRAY VOLUME (Gallons per Acre)	
Peach,	20 (concentrate)	
Nectarine,	to	
Apricot,	300 (full dilute)	
Tart Cherry,		
Plum,		
Prune		
Sweet Cherry	20 (concentrate to 400 (full dilute)	
Conifers	Dilute	Concentrate
Forest stands	Not used	10-20 (aircraft)
Christmas trees	100	10-50 (aircraft or ground equipment)
Nursery Beds	100	5 to 10 (ground equipment only)

CROP	DISEASES	TERRANIL 6L RATE PER		APPLICATION DIRECTIONS
		ACRE	100 GAL*	
Peach, Nectarine Apricot Cherry Plum Prune	Leaf curl, Coryneum blight (shothole)	3 1/8 to 4 1/8 pints	1 to 1 3/8 pints	For best control of both diseases apply at leaf fall in late autumn, using sufficient water and proper sprayer calibration to obtain uniform coverage. When conditions favor high disease levels, use the high rate of application and apply once or twice more in mid to late winter before budswell. If the leaf fall application is not practical, application of Terranil 6L for control of leaf curl may be made at any time prior to budswell the following spring. Where Coryneum blight (shothole) occurs, also apply at budbreak to protect newly emerging leaves and at shuck split to prevent fruit infections.
	Brown rot blossom blight	3 1/8 to 5 1/2 pints	1 to 1 3/8 pints	Use 4 1/8 to 5 1/2 pints per acre on trees taller than 20 ft. and 3 1/8 to 4 1/8 pints per acre on smaller trees. Make one application at popcorn (pink, red, or early white bud) and a second application at full bloom. If weather conditions favor disease development, make an additional application at petal fall.

CROP	DISEASES	TERRANIL 6L RATE PER		APPLICATION DIRECTIONS
		ACRE	100 GAL*	
Peach, Apricot, Cherry, Plum, Prune	Cherry leaf- spot; peach, nectarine, apricot scab	3 1/8 to 4 1/8 pints	1 to 1 3/8 pints	In addition to the bloom appli- cations listed above, make one application at shuck-split. Do not apply Terranil 6L after shuck-split and before harvest. If additional disease control is needed before harvest, use another registered fungicide. For control of cherry leaf spot after harvest, make one appli- cation to foliage within 7 days after fruit is removed. In orchards with a history of high leafspot incidence, make a second application 10-14 days later.
Conifers	Swiss needle- cast	2 3/4 to 5 1/2 pints	2 3/4 to 5 1/2 pints	Single application technique: In Christmas tree plantations or forest stands make one application in the spring when new shoot growth is 1/2 to 2 inches in length.
	Scleroderris canker (pines)	1 1/2 to 2 3/4 pints	1 1/2 to 2 3/4 pints	Make the first application in spring when new shoot growth is 1/2 to 2 inches in length. Make additional applications at 3 to 4 week intervals until condi- tions no longer favor disease development. For use in nursery beds, apply the highest rate specified on a 3 week schedule.
	Swiss needle- cast			
	Sirococcus tip blight	2 to 3 1/2 pints	2 to 3 1/2 pints	
	Rhizosphaera needlecast (spruces)	5 1/2 pints	5 1/2 pints	
	Scirrhia brown spot (pines)			
	Cyclaneusma and Lopho- dermium needlecast (pines)	2 3/4 to 5 1/2 pints	2 3/4 to 5 1/2 pints	Apply in early spring prior to buddbreak. Repeat applications at approximately 6 to 8 week intervals, until spore release ceases in late fall. Apply monthly during periods of fre- quent rainfall, and where Lophodermium infections occur during dormancy (Pacific NW). During drought periods, appli- cations may be suspended, then resumed upon next occurrence of needle wetness.

CROP	DISEASES	TERRANIL 6L RATE PER		APPLICATION DIRECTIONS
		ACRE	100 GAL*	
Conifers (Cont.)	Rhabdocline needlecast (Douglas fir)	1 1/2 to 2 3/4 pints	1 1/2 to 2 3/4 pints	Apply at budbreak and repeat at 3 to 4 week intervals until needles are fully elongated and conditions no longer favor disease development. In plan- tations of mixed provenance, or when irregular budbreak occurs, apply weekly until all trees have broken bud, then every 3 to 4 weeks as specified above. In nursery beds, use the high rate on a 3 week schedule.
	Botrytis seedling blight	1 1/2 to 2 3/4 pints	1 1/2 to 2 3/4 pints	Begin applications in nursery beds when seedlings are 4 inches tall and when cool, moist condi- tions favor disease development. Make additional applications at 7 to 14 day intervals as long as favorable disease conditions persist.
	Phoma twig blight			

\*Volumetric rates to be used only with full dilute spray volume specified on this label for tree and orchard crops.

NOTICE: Seller warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of merchantability or fitness for a particular purpose, express or implied, extends to the use of this product contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to Seller and Buyer assumes the risk of any such use.

Pesticide Toxicity Database Report

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CHEMICAL	Shaughnessy	CAS #	USEPATTERN	COMMONNAME	TAXONOMIC	Age/Size	Method	AI	Dosetype	Toxicity	Level	C.L.'s	Length	NOEL	EPA ID	Study		Categor.
																Completed	Reviewed	
Chlorothalonil	081901	1897-45-6	Fungicide															

Note:MRID40098001=Mayer and Eilersieck, 1986 MRID40228401=F.L.Mayer,EPA,Gulfbreeze MRID00022923=E.Hill et al,USFWS MRID00001600= Hudson,et al,USFWS, 1984 MRID003503=Johnson&F

CHEMICAL	Shaughnessy	CAS #	USEPATTERN												
Chlorothalonil	081901	1897-45-6	Fungicide												
COMMONNAME	TAXONOMIC	Age/Size	Method	AI	Dosetype	Toxicity	Level	C.L.'s	Length	NOEL	EPA ID	Study Completed	Study Reviewed	Reviewed by	Categ.
Fathead minnow	Pimephales promelas	Erlylf	R	96	MATC	3.0-6.5mg/L	PPM	N.R.	N.P.	3.0 PPM	00030391	1980	1980	D.Rieder	C
Mallard duck	Anas platyrhynchos	16 wk+	O	87	LD50	158 mg/Kg	MGK	125-201	14 D	46 mg/Kg	00030395	1978	1980	D.Rieder	C
Mallard duck	Anas platyrhynchos	16 wk+	O	96	LD50	>4640mg/Kg	MGK	N.R.	14 D	N.R.	00068753	1977	1978	D. Urban	C
Mallard duck	Anas platyrhynchos	Juv.	D	93.6	LC50	>21500mg/L	PPM	N.P.	8 D	N.R.	00039146	1965	1983	D.Rieder	C
Bobwhite quail	Colinus virginianus	Juv.	D	93.6	LC50	5200 PPM	PPM	N.R.	8 D	N.R.	00039146	1965	1983	D.Rieder	C
Mallard duck	Anas platyrhynchos	14 d	D	96	LC50	>10,000ppm	PPM	N.R.	8 D	N.R.	00030389	1979	1982	D.Rieder	C
Bobwhite quail	Colinus virginianus	Juv.	D	96	LC50	>10,000ppm	PPM	N.R.	8 D	N.R.	00030388	1979	1982	D.Rieder	C
Mallard duck	Anas platyrhynchos	8 D	D	99	LC50	2000 ppm	PPM	1499-267	8 D	N.R.	RIOCHL03	1981	1982	J.J.Bascietto	C
Bobwhite quail	Colinus virginianus	Juv.	D	99	LC50	1746 ppm	PPM	1384-226	8 D	562 ppm	RIOCHL04	1981	1982	J.J.Bascietto	C
Sheepshead minnow	Cyprinodon variegatus	Juv.	S	Tech	LC50	32 ug/L	PPB	30-36	96 hr	20 ppb	RIOCHL07	1982	1983	D.Rieder	C
Spot	Leiostomus xanthurus	Juv.	F	Tech	LC50	32 ug/L	PPB	N.R.	48 hr	N.R.	Gulfbreeze	1986		F.L.Mayer, Jr.	C
Mallard duck	Anas platyrhynchos	Erlylf	R	99.6	MATC	no effect	PPM	N.R.	1Gen	>50 ppm	00041441	1976	1980	D.Rieder	C
Bobwhite quail	Colinus virginianus	Erlylf	R	99.6	MATC	no effects	PPM	N.R.	1 Gen	>50 ppm	00041440	1976	1980	D.Rieder	C
Dungeness crab	Cancer magister	N.P.	S	75	EC50	0.14 mg/L	PPM	N.R.	96 hr	N.R.	05001356	1976	1982	D.Rieder	S
Bluegill sunfish	Lepomis macrochirus	N.P.	S	Form	LC50	0.167 mg/L	PPM	N.R.	96 hr	N.R.	00087258	1973	1982	D.Rieder	S
Green alga	Selenastrum capricornutum	N.R.	G	97.9	EC50	0.19 mg/L	PPM	0.18-0.21	120hr	0.05 PPM	42432801	1992	1992	Tracy Perry	C
Water flea	Daphnia magna	1st-I	FT	54	EC50	97.0 ug/L	PPB	86-109	48 hr	49 PPB	42433806	1992	1992	Tracy Parry	C
Bluegill sunfish	Lepomis macrochirus	0.39 g	FT	54	LC50	26.3 ug/L	PPB	22.1-32.0	96 hr	15 PPB	42433804	1992	1992	Tracy Perry	C
Rainbow trout	Oncorhynchus mykiss	2.9 g	S	40.4	LC50	0.195 mg/L	PPM	0.16-0.259	96 hr	<.095PPM	42433805	1992	1992	Tracy Perry	IN
Note:MRID40098001=Mayer and Eilersieck,1986 MRID40228401=F.L.Mayer,EPA,Gulfbreeze MRID00022923=E.Hill et al,USFWS MRID00001600= Hudson,et al,USFWS,1984 MRID003503=Johnson&F															

Note:MRID40098001=Mayer and Ellersieck, 1986 MRID40228401=F.L.Mayer,EPA,Gulfbreeze MRID00022923=E.Hill et al,USFWS MRID00001600= Hudson,et al,USFWS,1984 MRID003503=Johnson&F

CHEMICAL	Shaughnessy	CAS #	USEPATTERN												
Chlorothalonil	081901	1897-45-6	Fungicide												
COMMONNAME	TAXONOMIC	Age/Size	Method	AI	Dosetype	Toxicity	Level	C.L.'s	Length	NOEL	EPA ID	Study Completed	Study Reviewed	Reviewed by	Categ.
Mysid	Mysidopsis bahia	<=24hr	S	100	MATC	>.83<1.2	PPB	N.R.	28 d	N.R.	42433807	1991	1992	Tracy Perry	IN
Cucumber	Cucumis sativus	Seed	SG	97.9	NOEL	16 lb/A	LB/	N.A.	7 D	16	42433808	1992	1992	Tracy Perry	C
Onion	Allium cepa	Seedl	SE	97.9	NOEL	16 lb/A	LB/	N.A.	14 D	16	42433808	1992	1992	Tracy Perry	C
Soybean	Glycine max	N.R.	W	97.9	NOEL	16 lb/A	LB/	N.A.	14 D	16	42433809	1992	1992	Tracy Perry	C

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