113201

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EEE BRANCH REVIEW

DATE: IN 4/27/78 OUT 5/1/78 IN _____ OUT _____ IN _____ OUT _____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. _____

PETITION OR EXP. PERMIT NO. 7969-EUP-10

DATE DIV. RECEIVED _____

DATE OF SUBMISSION _____

DATE SUBMISSION ACCEPTED _____

TYPE PRODUCTS(S): I, D, H, (F,) N, R, S _____

DATA ACCESSION NO(S). _____

PRODUCT MGR. NO. Zink

PRODUCT NAME(S) Ronilan

COMPANY NAME BASF Wyandotte

SUBMISSION PURPOSE EUP - Strawberries

CHEMICAL & FORMULATION Active Ingredient: 3-(3,5-Dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione --50%

Inerts ----------50%

1a

RONILAN

100.0 Pesticidal Use

Ronilan is a contact fungicide used to control botrytis fruit rot on strawberries.

100.1 Application Methods/Directions/Rates

Ronilan will be applied by ground equipment. Coverage of the developing fruits is essential. The first application should be made not later than 10% primary bloom. The rate and timing of subsequent applications will vary according to botrytis disease pressure as affected by moisture and should follow guidelines given below.

		Rate lb. Product/A	
Moisture Conditions	Spray* Interval (Days)	1st Year Plants Or Sparse Foliage	Dense Foliage
FOR ALL AREAS EXCEPT FLORIDA:			
Frequent natural moisture (rain, fog, dew) or when using sprinkler irrigation (high disease pressure)	7-9	1.0	1½-2
Limited natural moisture infrequent sprinkler irrigation (low disease pressure)	10-14	1.0	1½-2
FOR FLORIDA:			
(winter production)	3-5	1.0	1½-2

*use spray interval throughout the bearing cycle.

Retreatment is recommended as soon as possible after extended wet periods (periods lasting more

than 24 hrs.), and then the recommended schedule should be resumed.

Time and Rate of Application for Broad Spectrum Fungus Disease Control:

At locations where fungus diseases such as anthracnose or leaf scorch occur together with botrytis, a tank mixture of Ronilan at 1 lb. product/A plus Captan 50 W at 4 lb. product/A or Benlate at 1/2 lb. product/A should be used.

100.3 Precautionary Labelling

No environmental precautions presented on the label.

100.4 Proposed EUP Program

100.4.1 Objectives

The objectives of the EUP Program are:

1. To determine optimum applications rates.

2. To determine efficacy in tank mixes with Captan and Benlate.

3. To test the product under the widely varying environmental conditions and production practices encountered throughout the country.

100.4.2 Duration/Date/Amount Shipped

1. The EUP is proposed for the 1978 growing season.

2. Permission is requested for 3,000 lbs. a.i. or 6,000 lbs. 50 W product.

100.4.3 Application Procedures

Application Rates:

One of the primary objectives of this Experimental Use Permit Program is to determine the optimum

rates of application to achieve satisfactory disease control. Rates of 1/2, 3/4, and 1 lb. ai/A will be tested. In addition to these three rates, BAS 352 04 F at 1/2 lb ai/A should be tank mixed with a registered broad spectrum fungicide, e.g., Captan or Benlate, to determine efficacy. A mixture such as this may be needed at locations where diseases other than botrytis fruit rot are also important. Therefore, four rates will be tested. The 3/4 lb. rate is the numerical average of the proposed rates and will be used in calculations to determine material needs.

Number of Applications:

Multiple applications beginning at 10% primary bloom and continuing throughout the fruit-bearing cycle at specified spray intervals are needed. The number of applications will be dependent upon several factors, e.g., climatic conditions, disease severity, length of bearing cycle, etc., and will range from as many as 40 in Florida to 2-4 in Michigan, and with California in the range of 12-14 applications per season. An estimate of ten applications per season per test location is used in the calculation.

Spray Volume:

Application of Ronilan should be made in not less than 100 gpa spray solution to obtain thorough coverage of the fruiting structures and foliage of the plants.

Spray Pressure (PSI):

An operating pressure of 60-150 psi is recommended to obtain penetration of the spray through the canopy.

Nozzle Type:

Cone-type nozzles are recommended in all instances for best coverage.

Nozzle Arrangement:

Spray booms with not less than 3 nozzles per row (1 over row: 2 side drops) are recommended.

Restrictions:

Do not apply Ronilan during rain. Wait until conditions are such that the spray can dry on the plants.

100.4.4 Target Pests

Botrytis fruit rot

100.4.5 Geographical Site Features

Table 1

Season and State	Total Strawberry Acreage	Pounds Active Ingredient	Pounds Product
Winter:			
FL	1,600	200	400
Spring:			
AR	1,300	50	100
CA	15,000	1,325	2,650
IL	1,100	100	200
IN	700	50	200
KY	700	25	50
LA	1,200	50	200
MD	570	125	250
MI	5,200	150	300
MO	500	50	100
NJ	1,300	100	200
NY	1,300	100	200
NC	2,000	50	100
OH	1,600	100	200
OK	600	25	50
OR	7,200	175	350
PA	1,300	50	100
TN	800	50	100
TX	300	50	100
VA	700	50	100
WA	3,500	100	200
WI	1,300	25	50
Totals	49,770	3,000	6,000

The registrant has provided the following rationale for selection of test areas:

There are five major strawberry production areas in the United States. These areas are best represented by the states of 1. California, 2. Florida, 3. Washington-Oregon, 4. Michigan-Ohio, and 5. New York-New Jersey-Maryland. Commercial production is not limited to the above areas and can be found in almost every state in the continental U.S.A. This proposed program is focused on the five major areas but includes additional states. A total of 21 states are listed in Table 1. Trials are needed in all states to sample the widely varying environmental conditions and production practices encountered throughout the country. The number five is used as the variable level to figure the amount of material needed to conduct the program.

100.4.6 Test Features/Description *

1. Number of Tests Per Growing Area:

   The requested number of tests per growing area is ten. This should be adequate to obtain information on disease control and yield response that is representative of each growing area. The multiplication factor used in the calculation, therefore, is ten.

2. Average Plot Size in Acres:

   The average total plot size proposed for this program is 2.0 acres. Plots of this size should reduce edaphic and crop variation to acceptable levels. Therefore, it is proposed that 2.0 acres be the experimental plot size in this program.

3. A summary of the calculations used to determine the amount of BAS 352 04 F needed to conduct this Experimental Use Permit Program is shown in Table 2.

* Registrants rationale provided below.

Table 2. Calculation of Quantities of BAS 352 04 F For Experimental Use Permit Program on Strawberries

	Variable Levels
A. Label Variables	
1. Crop - one (strawberries)	1
2. Application Rates	4
3. Number of Applications	10
B. Other Variables	
1. Total from A (1 x 4 x 10)	40
2. Number of Strawberry Growing Areas	5
3. Number of Tests per Growing Area	10
4. Average Plot Size in Acres	2

Total treatment acreage involved in EUP is, therefore:

40 x 5 x 10 x 2 = 4,000 acres

Assuming average rate of 3/4 lb. ai/A, requirement for EUP is:

3,000 lb ai

Equivalent to 6,000 lb 50 W product.

101.0 Chemical and Physical Properties

Chemical Name:

3-(3,5-Dichlorophenyl)-5-Ethenyl-5-Methyl-2, 4,Oxazolidinedione.

A white, acetone soluble powder

102.0 Behavior in the Environment

Pesticide has not been reviewed by EC at the time of this report.

103.0 Toxicological Properties

103.1 Acute Toxicity

103.1.1 Mammal

Rat LD_{50} > 10,000 mg/kg

Guinea pig LD_{50} = 3000 mg/kg

Mouse LD_{50} = 5,000 mg/kg

103.1.3 Fish

Bluegill sunfish LC_{50} (96 hr) >18.0 mg/L

Rainbow trout LC_{50} (96 hr) = 47.3 mg/L

103.3.0 Subacute Toxicity

Bobwhite quail >5,620 ppm

VALIDATION SHEET

TEST TYPE: 8 Day Avian Dietary Bobwhite

TEST ID NO: ES-D

CHEMICAL NAME: BAS 352 F (Vinclozolin)

FORMULATION: PERCENT A.I. = 96.5% - Technical

VALIDATOR: R. Balcomb

DATE: 5/8/78

CITATION: Eight-Day Dietary LC_{50} - Bobwhite Quail. Project No. 147-115. March 3, 1978. Robert Fink and Joann Beavers. Wildlife International.

VALIDATION CATEGORY: Core

RESULTS: LC >5,620 ppm

At the 1000 ppm level toe picking[1] became evident on day 3 and this form of cannibalism was responsible for the one death which occurred at this level or day 5. At the 5,620 ppm dose level a transient lethargy was noted on day 2, after which time the birds appeared normal until the termination of the study. No overt symptoms of toxicity were noted at any other dose.

VALIDATION CATEGORY RATIONALE: The study generally adhers to EPA guidelines. No statistical test was run on the data but as no mortality was evident at the higher dosage levels this is acceptable.

REPAIRABILITY: N/A

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[1]Toe picking is an abnormal behavioral response probably related to over crowding or poor animal husbandry.

VALIDATION SHEET

TEST ID NO: ES-F

TEST TYPE: 96-hour LC_{50}: Bluegill sunfish

CHEMICAL NAME: BAS 352 F

FORMULATION: ? % a.i.

VALIDATOR: R. Balcomb

DATE: 5/8/78

CITATION: The Acute Toxicity of BWC Project VIII-1-H-145 BAS 352 F To the Bluegill Sunfish, Lepomis macrochirus Rafinesque. Union Carbide Environmental Services. March 7, 1978. Report prepared by C. W. Calmbacher.

VALIDATION CATEGORY: Supplemental

RESULTS: 1. 96 hr LC_{50} = 47.3 mg/L (37.1 - 60.3) 95% Conf. Limits

2. No effect level (96 hr.) <5.6 mg/L

The toxicity of BAS 352F to sunfish was studied at 22°C in a static "soft" water system. Five concentrations (5.6, 10, 18, 32, 56), a control and a solvent control were run. Fish were approximately 4 months of age, had a mean length of 35 mm and a mean weight of 0.51 grams. The percent active ingredient was not reported.

VALIDATION CATEGORY RATIONALE: The study generally adhers to EPA guidelines. The experimenter estimated the LC_{50} via a Spearman-Karber Technique (Finney, 1970). This reviewer recalulated the LC_{50} using the Spearman-Karber trimmed technique and obtained a comparable 96 hour LC_{50} (48.69 mg/L).

REPAIRABILITY: If the registrant submits the percent active ingredient in BAS 352 F the study can be classified to Core.

VALIDATION SHEET

TEST ID NO: ES-G

TEST TYPE: 96 Hour LC_{50}: Rainbow Trout

CHEMICAL NAME: BAS 352 F

FORMULATION: Percent a.i.: ?

VALIDATOR: Richard Balcomb

DATE: 5/8/78

CITATION: The Acute Toxicity of BWC Project VIII-1-H-145 BAS 352 F to the Rainbow Trout Salmo gairdneri (Richardson). Union Carbide Environmental Services, Tarrytown, N.Y. Report prepared by Charles W. Calmbacher.

VALIDATION CATEGORY: Supplemental

RESULTS: LC_{50} >18.0 mg/L

1. The toxicity of BAS 352 F was studied at 13°C in static freshwater. Ten fish were used at each of 5 concentration levels (1.8 - 18.0 ppm). Forty percent mortality was observed at the 18.0 ppm level, no other deaths were recorded.

   At concentrations above 18 ppm a white flocculent material was produced upon addition of BAS 352 F stock to dilution water. Testing above 18 ppm resulted in random mortality. The experimenter did not report trying other solvents to get around the solubility problem.

2. The no effect level was set at 1.8 ppm. Behavorial observations made during the test indicated that Rainbow trout exposed to concentrations of 3.2 mg/L and higher became irritated, darkly discolored and exhibited erratic swimming, labored respiration and abnormal surfacing and sounding behavior.

VALIDATION CATEGORY RATIONALE: The study was deemed supplemental as: (1) the percent active of the test material was not reported and (2) only one mortality estimate is reported--4 of 10 fish at 18 mg/L--and this not considered sufficient to identify the toxicity of the pesticide.

REPAIRABILITY: The test must be repeated with other solvents or otherwise altered to produce 0 percent, partial mortality and 100% mortality results that can be statistically evaluated.

104.0 Hazard Assessment

104.1 Discussion

Ronilan will be applied to strawberries at experimental rates of 1/2 to 1 lbs. a.i. (1-2 lbs. product) per acre. The pesticide will be applied by ground equipment and spray boom apparatus is recommended such that the nossle arrangements concentrate the spray on the rows of strawberry plants.

Residue estimates for the maximum rate of application are given in Table A, also included are the adjusted residue estimates that take into account the concentration of the pesticide on the rows of strawberry plants.

Table A

Residue PPM

	Fruits	Leaves (Forage/ Clover)
Uniform Coverage	7	58
Adjusted Residue (Pesticide concentrated on 60% of each acre)	11.6	96.6

The product will be applied on the average 10 times per season. In problem areas, such as Florida, the product can be applied up to 40 times. No Environmental Chemistry data is available, therefore, this reviewer was unable to predict residue buildup or degradation.

104.1.1 Non-Target Exposure

Wildlife use of strawberry fields is estimated (Wildlife Utilization of Cropland, Shell Oil, 1973) to range from insignificant to moderate throughout the country. The major strawberry regions (Oregon, Washington, Michigan etc.) report mammals, quail, pheasants and various songbirds using the fields for food and cover. Some exposure is, therefore, likely to occur but the relatively low toxicity

of the product to birds and mammals (Section 103.0) indicates that a diet of strawberries would constitute an exposure of less than 1/500 of the LC_{50} for the terrestrial organisms tested. The hazard posed by this EUP to wildlife is considered negligible.

104.1.2 Endangered Species Considerations

No hazard anticipated.

107.0 Conclusions

The Environmental Safety Section concurs with the proposed EUP for the application of Ronilan (BAS 352) to strawberries.

Prior to consideration of registration of the proposed use certain basic studies are required:

(a) the avian acute oral LD_{50} for one species of waterfowl (Mallard Duck, preferably) or one species of upland game bird (Bobwhite Quail or Ring-necked Pheasant);

(b) the dietary LC_{50} for one species of waterfowl (Mallard Duck). One of the species selected for these studies must be the same species selected for the acute oral avian study.

(c) the 96-hour LC_{50}'s for a coldwater species (Rainbow Trout) and a warmwater species (Bluegill Sunfish) of fish;

(d) the acute 48-hour LC_{50} for an aquatic invertebrate (Daphnia sp., preferably).

(e) an avian reproduction study is required for Bobwhite Quail and Mallard Ducks.

The above basic studies are required on the technical of each active ingredient. Avian testing protocols have been published in the Federal Register (Vol. 40, No. 123 - Wednesday, June 25, 1975). EPA publication EPA-660/3-75-009, Methods for Acute Toxicity Tests with Fish, Macroinvertebrates and Amphibians - April 1975, is recommended for aquatic studies.

107.3 Labelling

The following Environmental Precautions Statement must be prominently displayed on the label:

"Keep out of lakes, streams and ponds. Do not contaminate water by cleaning of equipment or disposal of wastes."

107.4 The following decisions were made concerning the fish and wildlife studies submitted in support of the application:

1. The eight-day avian dietary study for Bobwhite quail is acceptable and can be used to support registration of the pesticide.

2. The 96-hour LC_{50} for Bluegill sunfish is unacceptable as the test substance is inadequately described. If the registrant submits the percent of active ingredient in the test material the study will be reconsidered.

3. The 96-hour LC_{50} for Rainbow trout is unacceptable as insufficient mortality results were obtained to statistically calculate a valid LC_{50}. The experimenters reported that due to insolubility the product was not tested at levels over 18 ppm and therefore, complete mortality data were unavailable. It is suggested that the registrant consult the follow publications for alternative solvents:

   a. Methods for Acute Toxicity Tests with Fish, Macroinvertebrates and Amphibians, EPA-600/3-75-0009, April 1975. Project Officer - Charles E. Stephan.

b. Standard Methods for the Examination of Water and Wastewater. 1975. American Public Health Association.

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EEEB - RD WH 567
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