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DATA ACCESSION NO(S).

PRODUCT MANAGER NO. L. Rossi(21)

PRODUCT NAME(S) Rovral/ Iprodione

COMPANY NAME Rhone-Poulenc

SUBMISSION PURPOSE Proposed new use on strawberries

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
	Rovral	

ECOLOGICAL EFFECTS BRANCH REVIEW

Iprodione

100.0 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

Rhone-Poulenc is requesting a section 3 registration for iprodione as a formulated product known as Rovral® for use on strawberries.

100.2 Formulation and Information

Active Ingredients:	
Iprodione*	50%
Inert Ingredients:	50%
	100%

*3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxamide.

100.3 Application Methods, Directions, Rates

Rovral may be applied at 2 lb rpoduct/A (or 1.0 lb ai/A) in at least 100 gal/A. A maximum of 6 foliar sprays may be applied at 10- to 14-day intervals. First foliar application should occur no later than 10 percent bloom.

Rovral may also be applied as a 5-minute preplant dip of transplants immediately prior to planting.

100.4 Target Organisms

Botrytis Crown Rot and Gray Mold.

100.5 Precautionary Labeling

No precautionary labeling was submitted.

101.0 Hazard Assessment

Discussion

Strawberries were grown as a spring crop in the following States in 1986: Arkansas, California, Louisiana, Michigan, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Washington, and Wisconsin. Florida produced strawberries as a winter crop. A total of 39,450 acres of strawberries were grown in these 13 States in 1986, with California producing 40 percent of the crop (Agricultural Statistics, 1987).

Different varieties are adapted to different agricultural conditions. Factors that affect growth include soil fertility, temperature, and ripening season. Ripening season ranges, depending on the variety and region, from March until February. Generally, the strawberries ripen within a 6-week range in a particular area. One exception is California, where the crop is found to ripen from March until December (USDA Farmer's Bulletin No. 1043).

101.2 Likelihood of Adverse Effects to Nontarget Organisms

Terrestrial Organism Toxicity

The available avian toxicity data indicate Iprodione is slightly toxic to upland game (bobwhite LD_{50} = 930 mg/kg) on an acute oral basis and practically nontoxic to upland game and waterfowl (bobwhite LC_{50} = 9200 ppm, mallard LC_{50} = 20,000 ppm) on a dietary basis. The avian reproduction MATC was determined to be> 300 < 1000.

Iprodione is practically nontoxic to the rat with an acute oral LD_{50} > 3700 mg/kg.

Based on an earlier EEB review (January 21, 1982, J. Felkel and A. Vaughan, Stonefruits), no hazard to bees shoud exist based on acute toxicity data.

Aquatic Organism Toxicity

Acute-Freshwater

Iprodione is moderately toxic to coldwater and warmwater fish (rainbow trout LC_{50}= 4.2 ppm and catfish LC_{50}= 3.02 ppm). This chemical is highly toxic to Daphnia magna with a reported LC_{50}= 0.43 ppm. Iprodione is moderately toxic to juvenile crayfish with a 7 day LC_{50}> 4.1 ppm.

Acute-Marine

Iprodione technical is moderately toxic to the oyster with a reported 96 hour EC_{50}= 2.3 ppm, and highly toxic to mysid shrimp (LC_{50}= 0.68 ppm). This compound is moderately toxic to the sheepshead minnow with a reported LC_{50}= 7.7 ppm.

Chronic Toxicity- Freshwater

A Daphnia magna life cycle study indicates a MATC >0.17 <0.33 ppm. A fathead minnow early life stage toxicity study inidicates that the larval survival MATC to be <0.26 mg/1 and <0.55 mg/1.

Chronic Toxicity- Marine

A submitted mysid life cycle study indicated there was an effect on reproductive success at the lowest dose tested, 0.015 mg/1 (ppb) mean measured concentration.

Formulated Data

Formulated testing indicates Rovral(50% ai) is moderately toxic to warmwater fish and highly toxic to freshwater invertebrates (Blueqill LC_{50}= 8.6 ppm and Daphnia magna LC_{50}= 0.36 ppm.

Environmental Fate and Residues

Iprodione is stable to hydrolysis at a pH of 3, and the hydrolysis half-life is 20 days at a pH of 6 and 1 day at a pH of 9. The photolysis half-life is less than 1 week. Persistence of the parent compound in a field dissipation study ranged from 1 to 12 weeks. The water solubility is 13 ppm (EAB Review, December 17, 1987, H. Manning).

A field dissipation study indicated that initial concentration of parent iprodione ranged from 0.02 to 0.70 ppm, and the degradate RP-30228 comprised up to 50 percent of the total residues immediately posttreatment (EEB Review, July 30, 1987, H. Manninq).

The half-life of 14^C iprodione ranged from 20 to 70 days for soil under aerobic conditions and from 20 to 50 days for soil under anerobic conditions.

An incomplete study indicated residues in rice grain from 1.0 lb/A treatment gave 1.1 to 2.5 ppm at 32 to 36 days posttreatment in LA; in MS, 0.8 to 0.7 ppm 32 to 58 days posttreatment; and in AR, 0.5 to 0.2 ppm 38 to 43 days posttreatment. Residues in straw were generally slightly higher (EAB Review, May 5, 1986, H. Manning).

Iprodione residues accumulated in crayfish with maximum bioconcentration factors of 10X in edible tissue and 20X in whole organisms durinq 28 days exposure (EAB Review, July 30, 1987, H. Manning).

A bluegill sunfish accumulation study indicated a maximum bioaccumulation in edible tissue of 103X in 7 days, in viscera it was 555X in 7 days, and in whole fisn it was 177X in 7 days. By day 28, it was 65X (edible), 155X in viscera, and 52X (whole fish) (EAB Review, May 6, 1986, H. Manning).

Terrestrial Residues

The following residues are expected immediately after a single application at 1 lb ai/A (based on EEB's nomograph, Urban, D.J.; Cook, N.J. (1986); Hazard Evaluation Division, Standard Evaluation Procedure, Ecological Risk Assessment:

Substrate	Residues (ppm)
Short rangegrass	240
Long grasses	110
Leaves and leafy crops	125
Forage (alfalfa and clover, exposed seeds, small insects)	58
Pods containing seeds (large insects)	12
Fruit	7
Soil (top 0.1 inch after direct application)	22
Water (top 6 inches after direct application)	734 ppb

Aquatic Residues

The following aquatic estimated environmental concentrations (EECs) were based on the specific use on strawberries. Assuming a 10-acre basin draining into a 1-acre pond, the EEC was estimated to be 12.2 ppb (see Attachment A). This concentration is based on one application. Then 12.2 ppb was used as a baseline concentration for a Daily Accumulated Residue in Water Resulting in Runoff (ppb) (see Attachment B). The maximum expected residue is 36.4 ppb, and the average is 23.2 ppb.

101.3 Risk Assessment

A. Effects on Terrestrial Organisms

Avian Wildlife

Iprodione is slightly toxic to upland game on an acute oral basis, and practically nontoxic to both upland game and waterfowl on a dietary basis.

Based on the maximum estimated residues in short rangegrass, 240 ppm is well below both the triggers for restricted use classification and the endangered species classification (1/5 LC_{50} = 1840 ppm and 1/10 LC_{50} = 920 ppm, respectively). The residue of 240 ppm is also below the avian reproductive NOEL $\leq$ 300 ppm.

Mammals

Iprodione is not expected to pose a hazard to mammals based on the acute rat oral LD_{50} = 3700 mg/kg which is converted to 3700 ppm. The short rangegrass residue of 240 ppm is well below both the restricted use and endangered species classification triggers (740 and 370 ppm, respectively).

B. Effects on Aquatic Organisms

Technical Iprodione is moderately toxic to both freshwater and marine fish with repoted LC_{50} values ranging from 3.02 ppm to 7.7 ppm. Iprodione is highly toxic to freshwater invertebrates and moderately toxic to highly toxic to marine invertebrates. The Daphnia magna life cycle MATC was reported to be >0.17 <0.33 ppm. The fathead minnoe early life stage toxicity study MATC was >0.26 mg/l and <0.55 mg/l. The MATC was less than 15 ppb for the mysid life cycle study.

The EEC for one application exceeds the lowest reported NOEL for the mysid shrimp. The EECs (even for multiple applications) are well below the reported NOELs for the Daphnia magna and the fathead minnow.

C. Endangered Species Considerations

There are no concerns for endangered terrestrial wildlife, based on the estimated residues and the available toxicity data.

Based on the chronic toxicity data available on the freshwater fish and invertebrate, with the lowest NOEL reported to be 170 ppb (Daphnia magna), there are no concerns for endangered aquatic organisms. The EECs (up to 39 pbb) are well below the NOELs. The NOEL of the Daphnia magna was used as the endangered species trigger since freshwater species are of concern based on the use pattern, and since the chronic NOEL is a more definitive effect level than 1/20th of the LC_{50}.

D. Additional Information

Irpodione is registered for many crops, some of which include the following: apricots, cherries, nectarines, peaches, plums, prunes, almonds, grapes, head lettuce, broccoli, dry bulb onions, garlic, and peanuts. The application rates vary from 1.0 to 4.0 lb ai/A depending on the use pattern (Crop Protection Chemicals Reference, 4 th edition, 1988).

101.4 Adequacy of Toxicity Data

Studies have been submitted to support a section 3 registration for rice. These data are acceptable for this proposed use pattern, strawberries.

101.5 Adequacy of Labeling

Based on the toxicity and use pattern, the following labeling is required:

Environmental Hazards

> This pesticide is toxic to aquatic invertebrates. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water when disposing of equipment washwaters. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas.

Endangered Species Restrictions

At this point in time, endangered species labeling is not required since the estimated exposures are well below the levels of toxicological concern.

102.0 Classification

Based on the available toxicity data, and estimated exposure, Restricted Use Classification is not required.

103.0 Conclusions

EEB has completed an incremental risk assessment of the proposed registration of Iprodione for use on strawberries. Based on the available data, EEB concludes that there is no significant increase in exposure nor acute or chronic risks to nontarget aquatic organisms from the use of this compound on strawberries.

Attachments

Candy Brassard 8-18-88

Candy Brassard
Ecological Effects Branch
Hazard Evaluation Division (TS-769C)

Douglas J. Urban 8/18/88

Douglas J. Urban, Head-Section III
Ecological Effects Branch
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James W. Akerman 8/19/88

James W. Akerman, Chief
Ecological Effects Branch
Hazard Evaluation Division (TS-769C)

Strawberries

EEC CALCULATION SHEET

I. For Unincorporated Ground Application

A. Runoff

1.0 lb (ai/A) x 0.02 (2% runoff) x 10 (A) (from 10A drainage basin) = 0.2 lb (total runoff)

EEC of 1 lb ai direct application to 1 A pond 6-feet deep = 61 ppb.

Therefore, EEC = 61 ppb x 0.2 (lb) = 12.2 ppb.

II. For Aerial Application (or Mist Blower)

A. Runoff

1.0 lb (ai/A) x 0.6 (appl. efffi-ciency) x 0.02 (2% runoff x 10 (A) (from 10A drainage basin) = 0.2 lb (total runoff)

B. Drift

1.0 lb (ai/A) x 0.05 (5% drift) x 0.05 lb = (total drift)

Total loading = 0.12 lb (total runoff) + 0.05 lb (total drift) = 0.17 lb

Therefore, EEC = 61 ppb x 0.17 (lb) = 10.37 ppb.

A PROGRAM FOR PESTICIDE FATE SIMULATION

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name	IPRODIONE
Initial concentration (ppm)	12.2
Half-life	20
A number of application	6
Application interval	10
Length of simulation (day)	60

DAY	RESIDUE (PPM)
0	12.2
1	11.78442
2	11.383
3	10.99526
4	10.62072
5	10.25894
6	9.909478
7	9.571925
8	9.245871
9	8.930922
10	20.8267
11	20.11727
12	19.432
13	18.77008
14	18.1307
15	17.5131
16	16.91654
17	16.3403
18	15.78369
19	15.24604
20	26.9267
21	26.00948
22	25.1235
23	24.2677
24	23.44106
25	22.64257
26	21.87128
27	21.12626
28	20.40662
29	19.7115
30	31.24006
31	30.1759
32	29.148
33	28.15511
34	27.19605
35	26.26965
36	25.37481
37	24.51045
38	23.67553
39	22.86906
40	34.29006

44	29.85122
45	28.83438
46	27.85218
47	26.90343
48	25.987
49	25.10179
50	36.44673
51	35.20522
52	34.006
53	32.84763
54	31.72872
55	30.64792
56	29.60394
57	28.59553
58	27.62146
59	26.68057
60	25.77173
Maximum residue ----------	36.44673
Average residue ----------	23.24776