

US EPA ARCHIVE DOCUMENT

DP Barcode : D198736  
 PC Code No : 111601  
 EEB Out : FEB 22 1994

To: Lawrence Fried (PM41)  
 Product Manager  
 Registration Division (H7505C)

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

Attached, please find the EEB review of...

Reg./File # : 94WA0005  
 Chemical Name : Oxyfluorfen  
 Type Product : Herbicide  
 Product Name : Goal 1.6E  
 Company Name : State of Washington Dept. of Agriculture  
 Purpose : Section 18 for use on Raspberries to control primocanes in Washington State.

Action Code : 510 Date Due : 02/17/94  
 Reviewer : Harry Winnik Date In EEB: 01/28/94

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

①

DP BARCODE: D198736

CASE: 285334  
SUBMISSION: S456658

DATA PACKAGE RECORD  
BEAN SHEET

DATE: 01/28/94  
Page 1 of 1

\* \* \* CASE/SUBMISSION INFORMATION \* \* \*

CASE TYPE: EMERGENCY EXEMP ACTION: 510 SEC18-OC F/F USE  
RANKING : 75 POINTS (A)  
CHEMICALS: 111601 Oxyfluorfen (ANSI)

ID#: 94WA0005

COMPANY:

PRODUCT MANAGER: 41 REBECCA COOL 703-308-8417 ROOM: CS1  
PM TEAM REVIEWER: LAWRENCE FRIED 703-308-8328 ROOM: CS1  
RECEIVED DATE: 01/19/94 DUE OUT DATE: 03/10/94

\* \* \* DATA PACKAGE INFORMATION \* \* \*

DP BARCODE: 198736 EXPEDITE: N DATE SENT: 01/28/94 DATE RET.: / /  
CHEMICAL: 111601 Oxyfluorfen (ANSI)  
DP TYPE: 001 Submission Related Data Package

CSF: N LABEL: Y

ASSIGNED TO	DATE IN	DATE OUT	ADMIN DUE DATE: 02/17/94
DIV : EFED	01/28/94	/ /	NEGOT DATE: / /
BRAN: EEB	01/28/94	/ /	PROJ DATE: / /
SECT:	/ /	/ /	
REVR :	/ /	/ /	
CONTR:	/ /	/ /	

\* \* \* DATA REVIEW INSTRUCTIONS \* \* \*

Please review this proposed emergency use of oxyfluorfen (GOAL) on raspberries to control primocanes in Washington State. I believe EEB last reviewed this one in 1990 (90-WA-02 or 90-OR-03).

Regards,

Larry Fried  
308-8328

\* \* \* DATA PACKAGE EVALUATION \* \* \*

No evaluation is written for this data package

\* \* \* ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION \* \* \*

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
198734	TSCB	01/28/94	02/17/94	Y	N	Y
198735	TB-2	01/28/94	02/17/94	Y	N	Y

ECOLOGICAL EFFECTS BRANCH REVIEW  
SECTION 18

Oxyfluorfen

100 Section 18 Application

100.1 Nature and Scope of Emergency

The state of Washington is requesting an emergency exemption (Section 18) for the use of Goal 1.6E Herbicide for chemical pruning (cane suppression) of primocanes in raspberries grown in Washington in counties west of the crest of the Cascade Mountains: Whatcom, Skagit, Snohomish, Clallam, Island, King, Kitsap, Pierce, Thurston, Lewis, Cowlitz, Skamania and Clark.

100.2 Formulation Information

ACTIVE INGREDIENT

Oxyfluorfen.....19.4%

100.3 Target Organisms

Primocanes

100.4 Date, Duration

The use period will be from March 1, 1994 to June 1, 1994.

100.5 Application Methods, Directions, Rates

The product is to be applied by ground application only. The product may not be applied by air or through any type of irrigation equipment. The application rate will be "1 - 4 pints (0.2 - 0.8 lbs. a.i.) per broadcast acre in a minimum of 50 gallons of water per broadcast acre. A maximum of 6 pints (1.2 lbs. a.i.) per broadcast acre per season may be applied. A 1 to 2 pint rate will be recommended for use in Washington." "A 3 - 4 pint rate will only be used on very vigorous plants and only if the weather conditions demand it."

"For banded applications, the amount of Goal 1.6E Herbicide used per acre should be reduced according to the following formula:

$$\frac{\text{Band width (in inches)}}{\text{Row width (in inches)}} \times \text{Rate per broadcast acre} = \text{Amount needed per acre for banded application.}$$

A maximum of two applications may be made, not to exceed a total of 6 pints (1.2 lbs. a.i.) per broadcast acre per season."

A maximum of 5,133 acres may be treated.

100.6

Precautionary Labeling

"Do not apply directly to water or wetlands. Do not apply to saturated soil; do not apply to standing water. Do not contaminate water by cleaning of equipment or disposal of wastes. This product is highly toxic to aquatic invertebrates, aquatic plants, wildlife and fish. Use with care when apply in areas frequented by wildlife or adjacent to any body of water or wetland area. Do not apply when weather conditions favor drift or erosion from target areas. If soil is approaching saturation, avoid application when heavy rainfall is predicted to occur within 24 hours following planned application."

101 Hazard Assessment

101.1 Discussion

The state of Washington is requesting an emergency exemption (Section 18) for the use of Goal 1.6E Herbicide for chemical pruning (cane suppression) of primocanes in raspberries grown in Washington. Multiple applications are allowed but cannot exceed the maximum application of 6 pints (1.2 lbs. a.i.) of product per broadcast acre during one season.

101.2 Likelihood of Adverse Effects on Nontarget Organisms

Environmental Fate Data (information obtained from Environmental Fate and Groundwater Branch (EFGWB) Pesticide Environmental Fate One Line Summary, last update, 10/12/89.)

(V) = validated study (S) = supplemental study

- Oxyfluorfen is stable to hydrolysis at pH 4, 7, and 10. (V)
- Oxyfluorfen is stable to photolysis. (S)
- Oxyfluorfen has a half life of 291 day - 130 weeks in Clay Loam, >393 day in Sand Loam and Silty Loam and 556-596 days in Sandy Loam. (S)
- Oxyfluorfen degraded to 2-7% of the applied in 60 days with half lives to 554 and 605 days in anaerobic soils. (S)
- Runoff study showed that oxyfluorfen will not translocate to nearby aquatic compartments.

- Bluegill sunfish bioaccumulation: muscle 605 x; viscera 4360 x; whole fish 2200 x. 83-94% deperates in 14 days.

Terrestrial organisms

Based on the lowest values from core and supplemental studies, Oxyfluorfen is considered to be practically nontoxic to moderately toxic to birds and practically nontoxic to mammals (Northern bobwhite LD<sub>50</sub> >2150 mg/kg; Northern bobwhite LC<sub>50</sub> 390 ppm; Mallard LC<sub>50</sub> >4000 ppm; Rat LD<sub>50</sub> >5000). Supplemental data shows the reproductive NOEC <50 ppm. However, recently reviewed Avian Dietary LC<sub>50</sub> studies with Bobwhite quail and Mallard ducks (MRID 92136103, MRID 92136104) showed that the LC<sub>50</sub> of Oxyfluorfen technical, based on nominal concentrations, was >5000 ppm for both studies. In light of the new data as well as the previously reviewed Avian Acute Oral LD<sub>50</sub> and Avian Dietary LC<sub>50</sub> studies (Acc. #095583 and MRID #92136102), the EEB believes it appropriate for this Section 18 that it bases its hazard assessment on these new data.

If Oxyfluorfen is applied at 0.8 lbs. a.i./ Acre, the following residues (ppm) are expected to occur on terrestrial food items immediately after treatment as calculated using a nomograph presented in Hoerger and Kenaga (1972) based on historical measured residue data.

Upper limits and typical limits of residue on differing groups of plants

	(residues in ppm)	
	Upper Limit	Typical Limit
Range Grass (short)	192.00	100.00
Grass (long)	88.00	73.60
Leaves and Leafy Crops (vegetables and fruit)	100.00	28.00
Forage Crops (alfalfa, clover)	46.40	26.40
Pods Containing Seeds (legumes)	9.60	2.40
Fruit (cherries, peaches, grapes, citrus)	5.60	1.20

The data indicate that Oxyfluorfen is not expected to pose acute hazard to nontarget mammals or avian species.

According to the application directions, Oxyfluorfen may be applied twice. The two applications are not to

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exceed 6 pints of product (1.2 lbs. a.i.) per broadcast acre. Assuming an initial application of 4 pints (0.8 lbs. a.i.) and a second application of 2 pints (0.4 lbs. a.i.) 7 days later resulting in typical limits on range grass, the oxyfluorfen concentration, with a half life of 292 days, will exceed 138 ppm for the next month. Since the NOEC for Oxyfluorfen to Bobwhite quail <50 ppm (based on reduced body weights of 14 day old chicks), the proposed application would be expected to pose a chronic hazard to nontarget birds. Due to the limited acreages expected to be treated (a maximum of 5,133 acres total in thirteen counties), the fact that upland birds do not typically feed in one site for 5 days on an exclusive diet of grass and leafy crops and the fact that other than body weight, the Avian Reproduction study did not find other parameters affected, the proposed use of Oxyfluorfen is not expected to pose a significant hazard to avian wildlife.

Terrestrial Plants

The table below lists the EC<sub>25</sub>s of the most sensitive parameter tested for a dicot, monocot and root crop, the EEC of Oxyfluorfen as calculated using the "EEC calculation sheet for terrestrial plant exposure (copy attached), and the resultant risk quotients. EECs were calculated using the maximum application rate of 0.8 lbs. a.i./A and a 1% runoff rate (based on a solubility in water of 0.11 ppm).

Species	Group	Parameter	EC <sub>25</sub> lbs/acre	EEC lbs/acre	Risk Quotient
Cabbage	Dicot	Shoot Length	0.0026	0.008	3.077
Onion	Root Crop	Shoot Length	0.0038	0.008	2.105
Ryegrass	Monocot	Shoot Length	0.0058	0.008	1.379

Since all three risk quotients exceed the level of concern (LOC) (where the LOC is when the EEC divided by the EC<sub>25</sub> is greater than 1), the proposed use of Oxyfluorfen is expected to pose hazard to non-target terrestrial plants in areas adjacent to the treated field as a result of runoff from the treated field. However, due to the limited acreages expected to be treated (a maximum of 5,133 acres total in thirteen counties), the hazard is expected to be minimal.

The table below lists the EC<sub>25</sub>s of the most sensitive parameter tested for a dicot, monocot and root crop, the EEC of Oxyfluorfen as calculated using the "EEC calculation sheet for semi-aquatic plant exposure (copy attached), and the resultant risk quotients. EECs were calculated using the maximum application rate of 0.8 lbs. a.i./A and a 1% runoff rate (based on a solubility in water of 0.11 ppm).

Species	Group	Parameter	EC <sub>25</sub> lbs/acre	EEC lbs/acre	Risk Quotient
Cabbage	Dicot	Shoot Length	0.0026	0.08	30.77
Onion	Root Crop	Shoot Length	0.0038	0.08	21.05
Ryegrass	Monocot	Shoot Length	0.0058	0.08	13.79

Since all three risk quotients exceed the level of concern (LOC) (where the LOC is when the EEC divided by the EC<sub>25</sub> is greater than 1), the proposed use of Oxyfluorfen is expected to pose hazard to non-target semi-aquatic plants in a 1 acre area adjacent to the treated field as a result of runoff from a 10 acre drainage basin. However, due to the limited acreages expected to be treated (a maximum of 5,133 acres total in thirteen counties), the hazard is expected to be minimal.

#### Aquatic Organism

Based on core and supplemental studies, Oxyfluorfen may be characterized as very highly to moderately toxic to aquatic invertebrates and fish, respectively (LC<sub>50</sub>= Daphnia magna LC<sub>50</sub>=1.5 ppm; Grass shrimp (Palaemonetes pugio) LC<sub>50</sub>=31.7 ppm; Bluegill sunfish (Lepomis macrochirus) LC<sub>50</sub>=200 ppb; Rainbow trout (Oncorhynchus mykiss) LC<sub>50</sub>=410 ppb; Channel catfish (Ictalurus punctatus) LC<sub>50</sub>=400 ppb; Sheepshead minnow (Cyprinodon variegatus) ).

Assuming 1% runoff (based on a solubility in water of 0.11 ppm), an aquatic EEC was calculated using the formula for unincorporated ground application (see attached). An application rate of 0.8 lbs. a.i./Acre is estimated to result in an EEC of 4.88 ppb. a.i. in a 1 acre pond 6 ft. deep. Since this level is less than 1/10 the LC<sub>50</sub> for fish, the proposed use of Oxyfluorfen should not pose an acute hazard to aquatic fish. Since this level exceeds 1/10 the LC<sub>50</sub> value for Grass shrimp, the proposed use of Oxyfluorfen is expected to



pose an acute hazard to aquatic invertebrates. However, due to the limited acreages expected to be treated (a maximum of 5,133 acres total in thirteen counties), the hazard is expected to be minimal. Since the EEC is less than the Fathead minnow (Pimephales promelas) MATC of > 38 ppb < 74 ppb, the proposed use of Oxyfluorfen should not pose a chronic hazard to aquatic organisms.

**101.3 Endangered Species Considerations**

Hazard to endangered mammals and avian species from exposure is expected to be minimal based on low toxicity of Oxyfluorfen to mammals.

Hazard to endangered sea turtles as a result of runoff is not expected.

**101.4 Adequacy of Data**

The available data were adequate to quantify the risks of this section 18.

**101.5 Adequacy of Labeling**

The following labeling would be required on any Oxyfluorfen label.

"This product is toxic to 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 aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwater or rinsate."

**102 Conclusions**

The data indicate that Oxyfluorfen is not expected to pose hazard to nontarget mammals.

Although Oxyfluorfen is considered to be practically nontoxic to moderately toxic to birds, recently reviewed Avian Dietary LC<sub>50</sub> studies with Bobwhite quail and Mallard ducks showed that the LC<sub>50</sub> of Oxyfluorfen technical, based on nominal concentrations, was >5000 ppm for both studies. In light of the new data as well as the previously reviewed Avian Acute Oral LD<sub>50</sub> and Avian Dietary LC<sub>50</sub> studies, the EEB believes it appropriate for this Section 18 that it bases its hazard assessment on these new data. As such, the data

indicate that Oxyfluorfen is not expected to pose acute hazard to nontarget avian species. **NOTE:** The EEB notices that there is an order of magnitude difference (i.e. 390 vs 5000 ppm) in reported LC<sub>50</sub> values for the bobwhite quail (ACC # 095583 and MRID # 92136103), the eeb believes that prior to reregistration a comprehensive review of these studies regarding the possible causes for these differences be examined. The review should include feed analysis as well as other laboratory variables that may have contributed to the differences.

Although the expected residues do surpass the trigger for presumed hazard to nontarget birds and residues are expected to surpass the avian NOEC, due to the limited acreages involved, the fact that upland birds do not typically feed in one site for 5 days on an exclusive diet of grass and leafy crops, and the fact that other than body weight, the Avian Reproduction study did not find other parameters affected, the proposed use of Oxyfluorfen is not expected to pose a significant hazard to avian wildlife.

The data indicate that the proposed use of Oxyfluorfen is expected to pose an acute hazard to both terrestrial and semi-aquatic plants growing adjacent to the treated field. However, due to the limited acreages expected to be treated (a maximum of 5,133 acres total in thirteen counties), the hazard is expected to be minimal.

The data indicate that the proposed use of Oxyfluorfen should not pose an acute hazard or chronic hazard to fish.

The proposed use of Oxyfluorfen is expected to pose an acute hazard to aquatic invertebrates. However, due to the limited acreages expected to be treated (a maximum of 5,133 acres total in thirteen counties), the hazard is expected to be minimal.

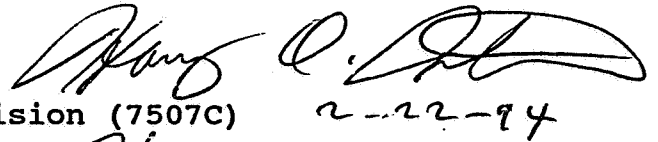
There are no endangered plants in Washington, therefore the proposed use of oxyfluorfen is not expected to pose a significant hazard to endangered plants.

Although there are several species of endangered birds in Washington (American Peregrine Falcon, Bald Eagle, Northern Spotted Owl, Marbled Murrelet), because of feeding habits or preferred habitats, none of them is expected to be impacted by the proposed use of Oxyfluorfen.

Hazard to endangered mammals from exposure is expected to be minimal based on low toxicity of Oxyfluorfen to mammals.

Hazard to endangered sea turtles as a result of runoff is not expected.

Harry A. Winnik  
Ecological Effects Branch  
Environmental Fate and Effects Division (7507C)



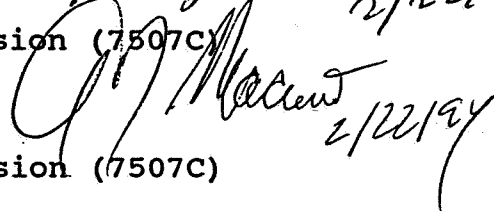
2-22-94

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Environmental Fate and Effects Division (7507C)



2/22/94

Anthony F. Maciorowski, Chief  
Ecological Effects Branch  
Environmental Fate and Effects Division (7507C)



2/22/94

Attachments

AQUATIC EEC CALCULATION SHEET FOR Oxyfluorfen

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I. For un-incorporated ground application

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A. Runoff

$$0.8 \text{ lb(s)} \times 0.01 \text{ (\% runoff)} \times 10 \text{ (A)} = 0.08 \text{ lb(s)} \text{ (total runoff from 10 A drainage basin)}$$

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

$$\text{Therefore EEC} = 61 \text{ ppb} \times 0.08 = 4.88 \text{ ppb}$$

II. For Incorporated ground application

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A. Runoff

$$\text{-----lb(s)} / \text{----- (cm)} \times \text{----- (\% runoff)} \times 10 \text{ (A)} = \text{ERR lb(s)} \text{ (total runoff)}$$

(depth of incorporation) (10 A drainage basin)

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \text{ERR (lbs)} = \text{ERR ppb}$$

III. For aerial application (or mist blower)

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A. Runoff

$$\text{-----lb(s)} \times 0.6 \text{ (application efficiency)} \times \text{----- (\% runoff)} \times 10 \text{ (A)} = 0 \text{ (total runoff)}$$

(10 A drainage basin)

B. Drift

$$\text{- lb(s)} \times 0.05 \text{ (5\% drift)} = 0 \text{ lb(s)} \text{ (total drift)}$$

$$\text{Total loading} = 0 \text{ lb(s)} \text{ (total runoff)} + 0 \text{ lb(s)} \text{ (total drift)} = 0 \text{ lb(s)}$$

$$\text{Therefore, EEC} = 61 \text{ ppb} \times 0 \text{ lbs} = 0 \text{ ppb}$$

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EEC CALCULATION SHEET FOR TERRESTRIAL PLANT EXPOSURE FOR Oxyfluorfen

1.) Unincorporated Ground Application (use seed germination/  
seedling emergence test  
results):

RUNOFF:            0.8 #ai/A X            0.01 runoff X 1 acre =            0.008 #ai/A

2.) Incorporated Ground Application (use seed germination/  
seedling emergence test  
results):

RUNOFF:-----#ai/A --:----- (cm) X -----X 1 acre = -----#ai/A  
(depth of (% runoff)  
incorporation)

3.) Aerial Application, Mist Blower  
and Sprinkler Irrigation (use Seed Germination/  
seedling emergence test  
results):

A.) RUNOFF: (from site after application)

-----#ai/A X            0.6 X            -----X 1 acre = -----#ai/A  
                          (application            (% runoff) (10 A  
                          efficiency)

B.) DRIFT: (from site during application)

-----#ai/A X            0.05            =            -----#ai/A  
                          (5% drift)

Total loading = -----#ai/A + -----#ai/A = -----#ai/A  
                          (total runoff)            (total drift)

4.) Aerial Drift Calculation (use vegetative vigor test results):

DRIFT:

-----#ai/A X            5.00%(drift)            -----

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EC25 plant phytotoxicity values are used for terrestrial  
non-target and endangered/threatened plants.

% runoff value can be 1%, 2%, or 5% depending on the water  
solubility of the pesticide

EEC CALCULATION SHEET FOR SEMI-AQUATIC\* PLANT EXPOSURE FOR Oxyfluorfen

1.) Unincorporated Ground Application (use seed germination/  
seedling emergence test  
results):

RUNOFF:            0.8 #ai/A X            0.01 runoff X10 acres =            0.08 #ai/A

2.) Incorporated Ground Application (use seed germination/  
seedling emergence test  
results):

RUNOFF:-----#ai/A -:----- (cm) X -----X 10 acres -----#ai/A  
(depth of            (% runoff)  
incorporation)

3.) Aerial Application, Mist Blower and Sprinkler Irrigation (use Seed Germination/  
seedling emergence test  
results):

A.) RUNOFF: (from site after application)

-----#ai/A X            0.6 X            -----X 10 acres -----#ai/A  
                                (application            (% runoff) (10 A  
  efficiency)

B.) DRIFT: (from site during application)

-----#ai/A X            0.05 =            -----#ai/A  
                                (5% drift)

Total loading =            -----#ai/A + -----#ai/A =            -----#ai/A  
                                (total runoff)            (total drift)

4.) Aerial Drift Calculation (use vegetative vigor test results):

DRIFT:

-----#ai/A X            5.00%(drift) -----

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\* Semi-aquatic plants that require saturated soils for some part of their life-cycle (wetlands, marshes, bogs)

EC25 plant phytotoxicity values are used for terrestrial non-target and endangered/threatened plants.

% runoff value can be 1%, 2%, or 5% depending on the water solubility of the pesticide