

US EPA ARCHIVE DOCUMENT

111601
SHAUGHNESSEY NO.

12
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 4/10/81 OUT 6/30/81

FILE OR REG. NO. 707 - 145

PETITION OR EXP. PERMIT NO. 1F2488 / 1H5296

DATE OF SUBMISSION 3/81

DATE RECEIVED BY HED 4/10/81

RD REQUESTED COMPLETION DATE 6/15/81

EEB ESTIMATED COMPLETION DATE _____

RD ACTION CODE/TYPE OF REVIEW 335/Amendment -- Food Use

TYPE PRODUCT(S): I, D, H, F, N, R, S Herbicide

DATA ACCESSION NO(S). _____

PRODUCT MANAGER NO. R. Mountfort (23)

PRODUCT NAME(S) Goal 2E Herbicide

COMPANY NAME Rohm and Haas Company

SUBMISSION PURPOSE Proposed registration of cotton, peppermint,
spearmint, pistachio, and walnut uses

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

111601 2-chloro-1-(3-ethoxy-4-nitrophenoxy)-4-
(trifluoromethyl) benzene (Oxyfluorfen) 22.6%

①

Goal 2E

100 Pesticide Label Information

100.1 Pesticide Use

Goal 2E is a selective postemergent herbicide for control of certain weeds in cotton, peppermint, spearmint, pistachios and walnuts.

100.2 Formulation Information

Goal is 22.6% Oxyfluorfen. That is 2 pounds active ingredient per gallon.

100.3 Application Methods, Directions, Rates

Cotton

Apply with ground application at 0.25 to 0.5 pounds active ingredient per acre. One application per year. Care must be exercised to keep the spray away from cotton leaves and dormant crops.

Spearmint and Peppermint

Apply with ground applicator when mint is dormant. Use up to 2 lbs a.i. per acre.

Pistachio and Walnut

Apply only to dormant trees, direct spray to base of tree. Use up to 2 lbs a.i. per acre.

100.4 Target Organism

Broadleaf weeds

100.5 Precautionary Labeling

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

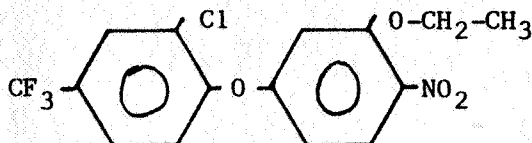
This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Do not apply when weather conditions favor drift from target areas.

101 Physical and Chemical Properties

101.1 Chemical Name

2-chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl) benzene

101.2 Structural Formula



101.3 Common Name

Oxyfluorfen

101.4 Trade Name

RH-2915

101.5 Molecular Weight

361.72

101.6 Physical characteristics (from EFB review, 2-8-79, by S. Howard document # 14 in EEB file)

Color: Orange

Odor: Faint

Form: Crystalline solid at room temperature

Melting Point: 84-85°

Vapor Pressure: 2×10^{-6} Torr at 25°C

Boiling Point: 358.7°C

101.7 Solubility

It is soluble at less than 0.1 ppm in water at 25°C, but is soluble in most organic solvents.

102 Behavior in the Environment

102.1 Soil

According to the EFB review dated 2/8/79, RH-2915 adsorbs strongly to most soils. It will leach very little. Half-life in soil is from 50 to 70 days.

102.2 Water

Because of its low solubility and tendency to adsorb strongly to soils, RH-2915 is not likely to reach high concentrations in water. However, it would occur in runoff should soil erosion take place. In any particular aquatic habitat it is unlikely that RH-2915 will remain in the water column; rather it will concentrate in the hydrosol.

102.3 Plant

RH-2915 was ¹⁴C labeled and applied at .25-.5 lb/Acre to several soil plots. Approximately 1 year later carrots, lettuce, oats and cotton were planted in the plots. Low levels of ¹⁴C-residues were found in carrots and oats, but not in cotton and lettuce. (See EFB review dated 2/8/79)

102.4 Animal

RH-2915 bioaccumulates in fish. (See EFB review, 2/8/79, pages 75 and 82) In Bluegill, concentrations in muscles, viscera and whole body reached 5.6 ppm (560X), 39 ppm (3900X) and 13 ppm (1300X), respectively, after the fish were exposed to approximately 10 ppb for 40 days. In Channel Catfish, the bioaccumulation factor was from 700X to 5000X in a 30 day study.

102.5 Microorganisms

No biodegradation of RH-2915 was observed in nonsterile soil when compared to sterile soil. (See EFB review dated 2/8/79, page 19)

RH-2915 did not inhibit the growth of most tested microorganisms. (see EFB review dated 2/8/79, page 20) the only inhibitory effect that was realized was at 500 ppm.

103 Toxicological Properties

The following toxicology information was taken from the EEB review by S. Fredericks dated 11/21/75.

103.1 Mammal

<u>Acute Species</u>	<u>Test Results</u>	<u>Test Material</u>
Rat	LD50 > 5000 mg/kg	Technical
Dog	LD50 > 5000 mg/kg	Technical
Rabbit	Acute Dermal > 10,000 mg/kg	Technical
Rat	LD50 = 5.8 ± 0.21 g/kg (24 hrs)	24.3% a.i.
Rabbit	Acute Dermal > 3,000 mg/kg	24.3% a.i.
Rat	LD50 = 5.05 ± 0.11 g/kg (14 days)	24.3% a.i.

Chronic

Rat - mutagenicity study revealed no mutagenic effects. Test material assumed technical grade.

Rabbit - Teratology study; at 5,25, 125 mg/kg/day administered on days 6-18 of pregnancy; no important incidence of developmental abnormalities. Test material was technical grade.

103.2 Minimum Requirements

103.2.1 Avian Acute Oral

Bobwhite quail were tested with technical grade 73.2% a.i. The results show that the LD50 is probably greater than 5000 mg/kg. The test was validated as supplemental by R. Hitch in EEB review dated 2/7/79. The rationale was that the "feeding consumption data and weights of the birds after the test" were not presented.

103.2.2 Avian Dietary

<u>Species</u>	<u>Results</u>	<u>Category</u>
Bobwhite Quail	LC50 = 390 ± 22.7 ppm	Core
Mallard Duck	LC50 > 4000 ppm	Core

Both of these tests were validated by R. Hitch and reported in EEB review dated 2/7/79. Test material was 94% a.i.

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103.2.3 Fish Acute

<u>Species</u>	<u>Test Material</u>	<u>Results</u>	<u>Category</u>
Bluegill sunfish	94% a.i.	LC50 = 200 (130-310) ppb	Core
Rainbow trout	94% a.i.	LC50 = 410 (310-560) ppb	Core
Channel catfish	74% a.i.	Static LC50 = 400 (360-450) ppb	Core

103.2.4 Aquatic Invertebrate

Daphnia magna were tested for 48 hours in 82.2% active ingredient Goal 2E. The LC50 = 1.5 (0.75 - 2.9) ppm. The test was validated as core by R. Hitch and reported in the EEB review dated 2/7/79.

103.2.5 Freshwater clam (Elliptio complanta)

Test results show a 96 hr LC50 of 9.57 ppm with 74% a.i. The test is not core because the referenced protocol does not include a method for freshwater clams.

103.3 Additional Terrestrial Laboratory Tests

An avian reproduction test on both the mallard and bobwhite was requested by R. Hitch because of the persistence of Goal 2E. The study was conducted but considered invalid. It is being repeated on both birds but at only one concentration level (100 ppm). Reference letter dated 4/30/81 by R. Hitch (# 60 in EEB file on oxyfluorfen, 111601).

103.4 Additional Aquatic Laboratory Tests

103.4.1 Toxicity to Estuarine or Marine Animals

Palaemonetes pugio grass shrimp

The LC50 for grass shrimp in 74% a.i. goal is 31.7 (26.1-38.4) ppm. The test is considered core. (Ref. EEB 2/7/79 review)

Uca pugilator fiddler crab

The test was not considered core because the test material precipitated out of solution. No LC50 was calculated. (Ref EEB 2/7/79 review)

Crassostrea virginica Oyster

The test showed that the 48 hr LC50 with oyster larvae is probably greater than 32 ppb. The test will be used in a hazard assessment for this review; however, it was originally validated as supplemental since no LC50 was generated. (Ref EEB 2/7/79 review)

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103.4.2 Embryo-Larvae and Life-Cycle Studies

A fish reproduction study with fathead minnow (Pimephales promelas) was requested by R. Hitch in review 2/7/79. The test was submitted and showed the minimum threshold concentration which elicited response was >38<74 ppb. The test was initially considered supplemental by R. Hitch in a 4/22/80 review because the applicant failed to submit the Goal concentration sampling schedule for each replicate of the test. Subsequently the needed information was submitted (review 9/17/80); the test is now considered acceptable.

103.5 Field Tests

An aquatic field monitoring study was requested by R. Hitch to support a registration of Goal on corn and soybeans. The study is in progress at this time.

104 Hazard Assessment

104.1 Discussion

104.1.1 Summary of Toxicity

According to test results from the Toxicology Branch files, Goal 2E is practically non-toxic to mammals.

Avian toxicity test results are varied showing Goal 2E as practically non-toxic in some cases (mallard LC50 and bobwhite LD50), and highly toxic in another case (bobwhite LC50). The results of the avian reproductive test are not available.

Goal 2E is highly toxic to freshwater fish (bluegill, rainbow trout, and channel catfish) and moderately toxic to aquatic invertebrates and some marine and estuarine organisms. The fish reproductive test with fathead minnow showed adverse effects at between 38 and 74 ppb.

104.1.2 Summary of Fate

Upon application Goal 2E will bind tightly to soil, not leach, and only runoff if soil erosion occurs. It is persistent with a field half-life of 50-70 days (personal comm. D. Moraski, EFB, 6/23/81)

It could be taken up by plants at low levels.

If soil erosion does occur, Goal will be found in surface water and sediment. It will remain in the water column in low quantities and tend to concentrate in the hydrosol.

Tests show Goal 2E bioaccumulates in fish.

Goal 2E is not metabolized by microorganisms, does not chemically degrade, nor does it hydrolyze. The primary route of dissipation is through volatilization and photodegradation.

104.1.3 Proposed Uses

104.1.3.1 Cotton

Cotton is grown throughout the south and southwest. There are 13,360,000 acre planted in the United States. By state, Texas has the most acreage with 7 million acres. California is next with 1.5 million, then Mississippi with 1.2 million. Specific areas where cotton growing is concentrated are: along the Mississippi River in Mississippi, Louisiana, Arkansas and Tennessee; from central to northwest Texas and southwestern Oklahoma; and in the San Joaquin Valley in California. A considerable amount of cotton is grown in Texas coastal counties. Application rate is one half pound per acre.

104.1.3.2 Spearmint and Peppermint

There is approximately 100,000 acres of peppermint grown in Oregon, Washington, Idaho, Indiana and Wisconsin. Approximately 46,100 acres of spearmint are grown in Washington, Indiana, Idaho, Wisconsin, and Iowa. Over 63% of all mint is grown in Washington and Oregon. Application rate of Goal 2E on mint is 2 lbs per acre.

104.1.3.3 Pistachios and Walnuts

Most pistachios produced in the United States are grown in the San Joaquin Valley in California. There are about 31,000 acres in 12 counties (Personal Comm., Dr. Julian Crane, Univ. of Cal., Davis) Walnuts are grown mostly (98%) in California with about 2% in Oregon (Personal Comm., M. Brooks, Food and Nut Laboratory, Dept. of Agriculture). There are about 161,800 acres in California and 4,800 acres in Oregon. In California they are concentrated in the Sacramento Valley (1974 census of Agriculture). The application rate of Goal 2E for nuts is also 2 lbs per acre.

104.1.4 Estimated Environmental Concentrations

104.1.4.1 Terrestrial

Goal would be applied to cotton at 0.5 lbs/acre and to mints and nuts at 2 lbs/acre. The following table shows the concentrations of Goal that could occur following direct application.

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POSSIBLE CONCENTRATIONS OF GOAL IN PPM (FROM NOMOGRAPH)

<u>Substrate</u>	<u>Application</u>	<u>Rate</u>	(lbs/acre)
	0.5		2
Short Range Grass	120		480
Long Grass	55		220
Leaves and Leafy Crops	62.5		250
Forage	29		116
Pods Containing Seeds	6		24
Fruit	3.5		14
Insect Bodies	29		116
Soil to 1 inch	1.1		4.4
Soil to 2 Inches	0.5		2

Goal 2E binds tightly to soil and should not leach more than 2 inches in most soils.

Its long half-life and low solubility should cause Goal 2E residues to remain a considerable length of time.

Goal 2E would likely volatilize and photodegrade from soil slower than from vegetation and insect surfaces.

104.1.4.2 Aquatic

At the request of EEB, EFB performed a series of estimations of environment concentrations. Since no established scenarios have been agreed on for corn, soybeans or cotton, EFB agreed to use the application rates (0.5 and 2 lbs/ acre) in two scenarios that have been used in the past. (See page 1 of attached EFB memo dated June 25, 1981.) The EEC's were performed for 1 year (1 application) and 4 years (4 applications) to realize a cumulative effect. Since the rates of application for mints and nuts are no greater than the 2 lbs/acre used for corn, the EEC generated for that scenario will be sufficient to assess the environmental hazards involved with those uses. Presently a field monitoring study is underway to measure the residues of Goal 2E in the water and hydro soil adjacent to corn fields where Goal is being applied at 2 lbs per acre. The results of that study can be compared

to this EEC for corn so the cotton EEC can be adjusted accordingly. This is done instead of requesting an additional field study for cotton to measure sediment residues and effects on bottom-dwelling aquatic organisms. See the attached EFB memo dated June 25, 1981 for the EEC calculations.

<u>Large Basin (74.5 acres)</u>				<u>Small Basin (5 acres)</u>			
<u>Number of Applications</u>				<u>Number of Applications</u>			
<u>1</u>		<u>4</u>		<u>1</u>		<u>4</u>	
<u>corn and soybeans (2 lbs/acre)</u>							
1	ppm	1.1	ppm	hydrosoll	0.05	ppm	0.056 ppm
0.002	ppm	0.0022	ppm	water	0.00009	ppm	0.00010 ppm
<u>cotton (0.5 lbs/acre)</u>							
0.3	ppm	0.34	ppm	hydrosoll	0.01	ppm	0.011 ppm
0.0005	ppm	0.00056	ppm	water	0.00002	ppm	0.000023 ppm

104.2 Likelihood of Adverse Effects to Non-target Organisms

104.2.1 Cotton

Because of the low toxicity of Goal 2E to mammals, it is unlikely to have an adverse effect on them.

It is also unlikely that Goal 2E will occur on avian food items in high enough concentrations to be an acute problem. The possible chronic adverse effects of Goal 2E to birds cannot be assessed until the results of the avian reproductive test are available.

Based on the EEC using the 0.5 lbs/acre rate and the 74.5 acre basin with multiple applications, bottom feeding fish such as channel - catfish could be exposed to material in sediment containing Goal 2E residues of 340 ppb. The LC50 for catfish is 390 ppb. This EEC suggests the likelihood of chronic adverse effects when compared to the fathead minnow MATC (between 38 and 74 ppb). In addition, Goal 2E tends to bioaccumulate in fish as much as 3000X to 5000X. (EFB Review dated 2/8/79 by S. Howard on Goal 2E).

Assuming an LC50 of about 32 ppb for Oysters; clams and molluscs adjacent to or downstream from treated areas could experience acute effects.

The results of the field monitoring study will be used to determine if adverse effects will be experienced by estuarine organisms.

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104.2.2 Mints and Nuts

At the 2 lbs/acre application rate recommended for spearmint, peppermint, walnuts and pistachios, mammals would not be adversely affected.

Birds feeding on insects to which Goal 2E was directly applied could ingest concentrations up to one fourth the LC50 for bobwhite quail. Considering the limited acreage of these uses and the tendency of Goal 2E to photodegrade, the acute problem, if it exists, should not be significant or widespread.

Based on the EEC using the 2 lbs/acre rate and the 74.5 acre basin with 4 applications, bottom - feeding fish could be exposed to concentration greater than their LC50.

The EEC exceeds the oyster LC50, but does not exceed the aquatic Invertebrate (Daphnia magna) LC50.

The use of Goal 2E on mints and nuts may affect local populations of aquatic organisms depending on their sensitivity and habitat, and the actual residues that accumulate. But because of the limited acreage involved, the adverse effects should not be unacceptable.

104.3 Endangered Species Considerations

104.3.1 Cotton

Using Goal 2E on cotton may effect endangered plant, aquatic, or amphibian species. Consultation according to the Endangered Species Act is ~~initiated~~ ^{being} ~~initiated~~ ^{contemplated}

SBZ
12/17/1

104.3.2 Mints

Mints are grown in Washington, Oregon, Idaho, Iowa, Wisconsin and Indiana. Because of its relatively low toxicity and limited proposed usage, applying Goal 2E to mints is unlikely to have an effect on endangered mammal and bird species. By state, the following table shows the species of concern and an explanation of expected impact.

Washington

No aquatic species or plants

Oregon

<u>Species</u>	<u>Location</u>	<u>Comment</u>
Mcfarlanes four o'clock:	Wallowa Co.:	No effect because it is unlikely that any agricut activity occurs near the remaining populations. Application is via ground vehicle, so drift is not a factor.

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<u>Species</u>	<u>Location</u>	<u>Comment</u>
Mcfarlane's four o'clock	Idaho Co.	See " <u>Oregon</u> "

<u>Species</u>	<u>Habitat</u>	<u>Comment</u>
Northern monkshood	Talus slopes and cliffs	Unlikely that any agriculture activities would occur in vicinity of this type of habitat.

<u>Wisconsin</u>		
<u>Species</u>	<u>Location</u>	<u>Comment</u>
Long jawed cisco	Great Lakes	Small use area and high dilution factor should render Goal 2E harmless to this species.
Higgins eye pearly mussel	St. Croix and Mississippi River	Small acreage and ground vehicle application should result in no effect to this mussel species.
Northern monkshood	Talus slopes and cliffs	See "Iowa"

<u>Indiana</u>		
<u>Species</u>	<u>Location</u>	<u>Comment</u>
Long jawed cisco	Great Lakes	See "Wisconsin" above
Fat pocket book pearly mussel	Wabash and White Rivers	The small number of acres involved with mint production, the method of application (ground vehicle) will eliminate the potential effects of Goal on all endangered mussels
Orange Footed pimple back mussel	Ohio and Lower Wabash Rivers	
Pink mucket pearly mussel	Ohio and Wabash Rivers	
Rough pigtoe pearly mussel	Ohio, White and Wabash Rivers	

Sampsons pearly mussel	Wabash River
Tubercled blossom pearly mussel	Wabash River
White cats paw pearly mussel	Wabash and St. Josephs River
White warty back pearly mussel	Wabash

104.3.3

Nuts

Walnuts (English) and pistachios are grown primarily in California. The following discussion addresses each endangered plant and aquatic species in California; Mammal and bird species will not be effected because of the low toxicity of Goal 2E to them. Amphibians will also be addressed as they usually require water to reproduce and would therefore be susceptible to exposure.

ANIMALS

<u>Species</u>	<u>Location</u>	<u>Comment</u>
Santa cruze long-toed salamander	Santa cruz and Monterey County	Four populations known, one is in an agriculture area, however agriculture is row-crops and cattle-grazing. No effect will occur due to Goal 2E use on nuts.
Desert slender salamander	Riverside County	Found in crevices and under limestone slabs at base of cliff. No effect from any agricultural practices is likely.
Mohave Chub	San Bernadino Co.	Nuts not grown in vicinity of known populations.
Owens River pupfish	Southern Mono and Northern Inyo County	Nuts not grown in vicinity of known populations.
Unarmored threespine stickleback	Los Angeles County (Santa Clara River and tributaries)	No nuts grown in Los Angeles county

	Santa Barbara Co (San Antonio Creek)	This population is potentially threatened by pesticide runoff from upstream agricultural are as. However no pistachio or Walnuts are grown in the creek basin. (Personal Comm. George Goodall, Cal. Coop Ext. Service, Santa Barbara, Ca.)
Lahontan catthroat trout	Sierra and Nevada counties	Nuts not grown in these counties
Little kern golden trout	Tulare County (Sequoia Nat'l Park)	Nuts not grown in National Park
Paiute cutthroat	Mono County	Nuts not grown in Mono County

PLANTS

<u>Species</u>	<u>Location</u>	<u>Comments</u>
Antioch Dunes evening primrose	Antioch Dunes Contra Costa Co.	No agriculture in vicinity
Contra Costa wallflower	Antioch Dunes Contra costa co.	"
Cramptons Orcutt grass	Solano County Vernal lakebed	No effect expected, most walnuts grown north of I-80, vernal lakes are south of I-80. (Personal comm., John Okplisz, California Agricultural Commissioners Office, Fairfield, Ca.
Eureka Dune grass	Inyo County, Eureka Dunes & Eureka valley	No nuts grown in Inyo County
Eureka Evening primrose	Inyo County Eureka Dunes	"
McDonalds rockcress	Mendocino County	Nickel mining, not agriculture is the source of impact; no effect expected.
Salt marsh birds beak	San Diego and Ventura County	Confined to salt marsh, low acreage of nuts grown in counties, no effect expected

San Clemente broom, San Clemente Island bushmallow, San Clemente Island Darkspur, and San Clemente Island Indian paintbrush all are found on San Clemente Island. No nuts are grown there.

San Diego pogogyne	San Diego, San Diego Co.	Impacted by construction ORV's and dumping no effect expected from agriculture.
Santa Barbara Island liveforever	Santa Barbara Island	No agriculture... no impact
Raven's manzanita	San Francisco Co	No nuts grown in San Francisco Co.
Truckee barberry	Nevada Co.	No nuts in county

104.4 Adequacy of Toxic Data

The tests that have been submitted are not adequate See section 107.4
Data Adequacy Conclusions

104.5 Additional Data Required

Several tests are still required. See section 107.5 Data Requests

107 Conclusions

107.1 Environmental Fate and Toxicological Acknowledgements

The mammalian toxicity data was from Toxicology Branch reviews. The
Environmental Fate Branch performed EEC's and provided an environmental
fate profile for Goal 2E.

107.5 Data Requests

The following tests/studies are still required before additional major crop registration can be given.

<u>Test type</u>	<u>Species</u>
Avian Acute Oral	Upland game bird (bobwhite quail) or a water fowl (mallard duck)
Avian Reproduction	Suggested species are both the bobwhite quail and mallard duck
*Aquatic Invertebrate Reproduction	Daphnia magna
Field monitoring study:	In progress as part of conditional registration for soybeans

WHL see attached memo dated 1/7/83

*In addition to the fish reproduction test, an aquatic invertebrate life cycle test is necessary because this product is expected to transport to the water from the use site and it is persistent in water.

107.6. Special Notes

The EFB memo showing the calculations for the EEC, and their summary of the fate profile of Goal 2E are attached to the review in the EEB files.

107.3 Environmental Hazards Labeling

The hazards labeling is adequate

107.4 Data Adequacy Conclusions

The following tests have been submitted

<u>Test type</u>	<u>Species</u>	<u>Category</u>
Avian Acute Oral	Bobwhite quail	Supplemental
Avian Dietary	Bobwhite quail	Core
" "	Mallard duck	Core
Fish Acute	Bluegill	Core
" "	Rainbow trout	Core
" "	Channel catfish	Core
Invertebrate Acute	<u>Daphnia magna</u>	Core
Avian Reproduction	Bobwhite quail	Invalid
	Mallard duck	Invalid
Marine organism acute toxicity	grass shrimp	Core
" "	Oyster	Core (if applicant wishes to accept 32 ppb as LC50)
Fish reproduction	Fathead minnow	Core

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will probably ~~be~~ ^{SSB} 12/17/81
Also a letter ~~is~~ ^{is} being sent to the Office of Endangered Species, USFWS,
to initiate endangered species consultation for the use of Goal on cotton.

107.7

Recommendations

The Ecological Effects Branch (EEB) recommends that Goal 2E be registered for use on spearmint, peppermint, walnuts and pistachios as requested. However the EEB recommends against the registration of Goal 2E on cotton until the following conditions have been met.

1. The field monitoring study for corn and soybean is completed, and the results do not show that adverse impact to non-target species is likely to occur.
2. The other three tests under "Data Requests" have been submitted and the information incorporated into a hazard assessment showing that no adverse impact to non-target species is likely to occur.
3. Consultation under the Endangered Species Act Amendments of 1978 has been completed with the Office of Endangered Species concurring with the registration of Goal 2E for cotton.

Daniel Rieder 7/15/81
Daniel Rieder
Wildlife Biologist
Ecological Effects Branch

Norman Cook 7/15/81
Norm Cook
Head, Section 2, EEB
Ecological Effects Branch

Clayton Bushong 7/15/81
Clayton Bushong, Chief
Ecological Effects Branch/HED

ATTACHMENT TO
6/30/81 review on
Goal 2E

JUN 25 1981

To: Chief, Ecological Effect Branch
Hazard Evaluation Division

Thru: Chief, Review Section No. 1 ^{III}
Environmental Fate Branch, HED

From: Review Section No. 1
Environmental Fate Branch, HED

Attached find environmental fate information and/or EEC(s) requested for:

Chemical: Oxyfluorfen

Product Name: GOAL

Use Pattern for EEC Calculations: Use on corn, soybeans and cotton

Date in: 6/12/81

Date out: JUN 25 1981

EEC/EFP#: 67

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1.0 INTRODUCTION

EEB requested EEC calculations for oxyfluorfen (Goal 2E) in a lentic situation for corn, soybeans, and cotton.

Goal 2E is registered for use on corn and soybeans (EPA Reg. No. 707-142) and for use on cotton (EPA Reg. No. 707-145). The application rates are 2 lb ai/acre/yr for corn and soybeans and 0.5 lb ai/acre/yr for cotton.

2.0 ASSUMPTIONS

Two scenarios are used as requested by EEB. One will be called the metolachlor scenario and the other the alachlor scenario.

2.1 Metolachlor scenario assumptions:

- a) drainage basin is 74.5 A in size
- b) 44.7 A (60%) are planted with corn or soybeans
- c) pond area is 1 A with an average depth of 2.5 ft
- d) for the entire watershed 1.00% of the applied pesticide reaches the pond in a severe, worst-case, runoff event which produces an average of 0.5 in. of runoff from the total drainage basin.
- e) pond hydrosol contains 2.5% organic matter
- f) the K_d was estimated for this hydrosol from the water solubility of 0.1 ppm

2.2 Alachlor scenario assumptions:

- a) drainage basin is 5 A in size
- b) the entire area is used to grow corn or soybeans
- c) pond area is 2.471 A with an average depth of 6.56 ft
- d), e) and f) same as in previous scenario

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* proposed for cotton (EEB)

2.3 In addition EEB requested that EFB estimate the residues that might be found following 4 successive annual applications. Since it is known that Goal is not susceptible to hydrolysis nor to significant microbial degradation, the prediction of a "half-life" becomes difficult. However, it is also reasonable to assume that multiple applications do not result in residues that are simply additive. Therefore, a prediction of a half-life becomes necessary.

Recently an EXAMS simulation was performed for Goal. A result was the prediction of about 120 days for a system half-life (Goal PD 1-2-3, March 1981). Using this value as the half-life and the water hydrosoil concentrations determined from the above scenarios, concentration estimates after 4 successive yearly applications can be made.

2.4 EEC Calculations

Results of the calculations indicate the maximum EEC's under the conditions delineated are:

<u>Metolachlor Scenario</u>				<u>Alachlor Scenario</u>				
<u>Number of Applications</u>				<u>Number of Applications</u>				
<u>1</u>		<u>4</u>		<u>1</u>		<u>4</u>		
<u>corn and soybeans (2 lbs/acre)</u>								
1	ppm	1.1	ppm	hydrosoil	0.05	ppm	0.056	ppm
0.002	ppm	0.0022	ppm	water	0.00009	ppm	0.00010	ppm
<u>cotton (2.5 lbs/acre)</u>								
0.3	ppm	0.34	ppm	hydrosoil	0.01	ppm	0.011	ppm
0.0005	ppm	0.00056	ppm	water	0.00002	ppm	0.000023	ppm

Richard V. Moraski

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