036101
SHAUGHNESSEY NO.

REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 10-24-83 OUT 2-6-84

FILE OR REG. NO. 1471-70

PETITION OR EXP. PERMIT NO.

DATE OF SUMBMISSION 10-19-83

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RD REQUESTED COMPLETION DATE 2-13-84

EEB ESTIMATED COMPLETION DATE 2-6-84

RD ACTION CODE/TYPE OF REVIEW 400/Data

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

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. R. Mountfort (23)

PRODUCT NAME(S) Trifluralin Technical

COMPANY NAME Elanco Products Company

SUBMISSION PURPOSE Submission of data to support Part 158 requirements

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

Pesticide Name: Trifluralin

100 Submission Purpose

The company has referenced Tucker and Crabtree (1970) and Macek et al. (1976) as suitable studies to fulfill Guidelines Requirements under 72-2 and 71-2. The validity of these studies is requested to be reviewed.

101 Hazard Assessment

101.4 Adequacy of Toxicity Data

The two studies submitted under record number 108218 (Tucker and Crabtree, 1970; Macek et al; 1976) satisfy the requirements for avian acute oral toxicity testing (partially) and aquatic organism chronic toxicity testing (fully). The studies indicate an avian acute oral toxicity (LD_{50}) to trifluralin of >2000 mg/kg and an MATC for daphnids >2.4 <7.2 ppb and fathead minnows >1.9 <5.1 ppb.

L. C. Touart 2/8/84
Leslie Touart
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For Clayton Bushong Raymond W. Matthews 2/8/84
Chief
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DATA EVALUATION RECORD

1. CHEMICAL: Trifluralin

2. FORMULATION: 97% a.i.

3. CITATION: Macek, K.J. et al. (1976) Toxicity of four pesticides to water fleas and fathead minnows. Ecological Research Series. EPA-600/3-76-099. 57 pp.

4. REVIEWED BY: Les Touart
Fisheries Biologist
EEB/HED

5. DATE REVIEWED: 2/3/84

6. TEST TYPE: Aquatic invertebrate and fish life-cycle studies.

A. TEST SPECIES" 1. Daphnia magna 2. Fathead minnow

7. REPORTED RESULTS: The MATC for Trifluralin was estimated to be >2.4 and <7.2 ppb for Daphnids and >1.9 and < 5.1 ppb for Fathead minnows.

8. REVIEWERS CONCLUSIONS: The study is scientifically sound and fulfills the guideline requirements for an acceptable fish and aquatic invertebrate chronic toxicity studies.

Materials/Methods

Test Procedure

The test methods are consistent with current EPA guidelines for conducting chronic toxicity tests with aquatic organisms. Specifically for Daphnids: Test system - Mount & Brungs (1967) proportional diluter, flow-through; test vessel - glass battery, ARS; experimental design - 10 Daphnids/replicate, 4 replicates/concentration; age at initiation - < 24 hrs; duration - 64 days; environmental conditions - 19 ± 1°C, constant photoperiod.

Specifically for fathead minnows: Test system - Mount & Brungs proportional diluter, flow-through; test vessel - glass aquaria; experimental design - 40 fish/test chamber; age at initiation - 26 days; Duration - 61 weeks; environmental conditions - 19 ± 1°C, photoperiod = Evansville, Ind. Beginning with Dec. 1.

Statistical Analysis - ANOVA according to Steel and Torrie were performed on all measured biological parameters.

Discussion/Results

See tables. Based on the observed effects of Trifluralin on survival of Daphnia magna continuously exposed through three generations, the estimated MATC for this species is >2.4 <7.2 ppb. Based on the data derived from continuous exposure of fathead minnows to various concentrations of trifluralin, the maximum acceptable toxicant concentration for this species is >1.95 <5.1 ppb.

Calculated application factors for the water flea = 0.012-0.037 and for the fathead minnow = 0.017 - 0.044.

Reviewer's Evaluation

A. Test Procedure

The study generally followed acceptable procedures and represents state-of-the-art at the time the study was performed.

B. Statistical Analysis

Acceptable.

C. Discussion/Results

The data support the conclusions drawn.

D. Conclusions

1. Category: Core.

2. Rationale: N/A

3. Repairability: N/A

TABLE 17. MEAN[a] PERCENT SURVIVAL OF Daphnia magna CONTINUOUSLY EXPOSED TO TRIFLURALIN FOR 64 DAYS

Mean Measured Conc. (µg/l)	GENERATION[b] I DAY 8	15	22	GENERATION II DAY 29	38	43	GENERATION III DAY 50	57	64
52.7	90	70	38	35	0	0	0	0	0
25.6	90	90	48	20	5	2	0	0	0
14.0	88	83	65	85	43	13	38	35	15
7.2	90	45	43	50	23	20	8	8	0
2.4	98	93	90	90	88	50	93	93	75
Control	100	85	85	95	98	80	80[c]	80	75

[a]Each value represents the mean of four replicates

[b]Duration of exposure for generations I, II, and III were days 1-22, 22-43, 43-64, respectively

[c]On day 47, two control containers over flowed with loss of animals. Mean survival is for remaining two replicates

TABLE 18. MEAN[a] PRODUCTION OF YOUNG PER FEMALE Daphnia magna CONTINUOUSLY EXPOSED TO TRIFLURALIN FOR 64 DAYS

Mean Measured Conc. (µg/l)	GENERATION[b] I DAY 15	22	GENERATION II DAY 38	43	GENERATION III DAY 57	64
52.7	3	5	0	0	0	0
25.6	15	12	8	0	0	0
14.0	11	15	18	9	16	2
7.2	11	25	32	15	16	0
2.4	18	30	31	8	23	5
Control	13	29	30	13	12	9

[a]Each value represents the mean of four replicates

[b]Duration of exposure for generations I, II, and III were days 1-22, 22-43, 43-64, respectively

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TABLE 25. SURVIVAL AND GROWTH OF FATHEAD MINNOWS (Pimephales promelas) AFTER 30 DAYS, 60 DAYS AND 61 WEEKS CONTINUOUS EXPOSURE TO TRIFLURALIN

Item	Mean measured trifluralin concentration (µg/l)											
	16.5		8.2		5.1		1.9		1.5		Control	
	A	B	A	B	A	B	A	B	A	B	A	B
30 DAYS												
% Survival	23	87	90	93	93	100	100	97	100	97	100	100
Total Length (mm)	19	20	24	22	20	21	22	20	17	18	21	21
S.D.[a]	6.2	5.0	7.3	5.0	5.1	5.4	5.2	4.3	4.2	3.8	4.3	3.5
60 DAYS												
% Survival[b]	0	0	85	93	93	100	100	95	100	93	100	100
Total Length (mm)	-	-	26	26	24	25	26	26	22	22	23	26
S.D.	-	-	6.2	5.2	6.4	5.8	5.2	5.2	4.7	4.3	5.1	5.0
61 WEEKS												
% Survival[c]	-	-	0	0	13	47	80	67	73	73	67	100
♂/♀	-	-	-	-	1/1	3/4	5/7	5/5	6/4	3/6	3/3	5/7
Extra ♂ removed	-	-	-	-	0	0	0	0	1	2	4	3
Total Length (mm)												
♂	-	-	-	-	60	60	66	55	65	63	60	63
♀	-	-	-	-	53	58	56	57	49	53	61	58
Total Weight (g)												
♂	-	-	-	-	2.0	3.0	3.6	2.2	3.3	3.3	3.7	2.8
♀	-	-	-	-	1.6	1.5	1.7	1.6	1.5	1.8	2.0	1.9

[a] Standard deviation

[b] Survival based on 40 fish per duplicate

[c] Survival based on 15 fish per duplicate after thinning at 60 days

TABLE 26. SPAWNING RESULTS, EGG HATCHABILITY, AND SURVIVAL AND GROWTH OF FATHEAD MINNOW (Pimephales promelas) FRY AFTER 30 AND 60 DAYS EXPOSURE TO VARIOUS CONCENTRATIONS OF TRIFLURALIN

	Mean measured trifluralin concentration (µg/l)											
	16.5		8.2		5.1		1.9		1.5		Control	
Item	A	B	A	B	A	B	A	B	A	B	A	B
# ♀ spawning	0	0	0	0	5	4	8	6	5	6	3	7
Mean spawning/♀	0	0	0	0	3	7	2	2	0	1	2	3
Mean eggs spawned/♀	-	-	-	-	225	432	64	104	0	20	55	229
Mean eggs/spawn	-	-	-	-	63	60	36	42	-	20	23	76
% Hatchability[a]	-	-	-	-	89	73	95	75	-	-	94	88
# Hatchability samples	0	0	0	0								
30 DAYS												
% Survival					83	60	56	-	-	-	-	84
Mean Total Length (mm)					16	19	19	-	-	-	-	17
S.D.[b]					3.5	3.2	2.1	-	-			3.6
60 DAYS												
% Survival					62	59	56	-	-	-	-	74
Mean Total Length (mm)					21	28	28	-	-	-	-	22
S.D.					5.4	4.8	4.6	-				5.7
# fry groups[c]					2	2	3	0	0	0	0	2

[a] Hatchability samples contained 50 one day old embryos

[b] Standard deviation

[c] Each larval group contained 40 one day old larvae

DATA EVALUATION RECORD

1. CHEMICAL: Trifluralin

2. FORMULATION: 96.7% a.i.

3. CITATION: Tucker, R.K. and D.G. Crabtree. (1970) Handbook of Toxicity of Pesticides to Wildlife. Res. Pub. 84 USDI. pp 131.

4. REVIEWED BY: Les Touart
Fisheries Biologist
EEB/HED

5. DATE REVIEWED: 2/3/84

6. TEST TYPE: Avian acute oral.

A. TEST SPECIES: 1. Mallard Duck 2. Pheasant

7. REPORTED RESULTS:

The LD_{50} for female mallards and male pheasants is greater than 2000 mg/kg.

8. REVIEWERS CONCLUSIONS: The study is scientifically sound but does not fulfill the guideline requirements for avian acute oral toxicity testing with upland gamebirds and waterfowl. With an LD_{50} >2000 mg/kg, Trifluralin is considered practically non-toxic to birds in acute oral exposures. The study is repairable with submission of dose/mortality data (specifically number tested).

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