1-17-95

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Chemical No.: 036101
DP Barcode: D208589
Submission: N/A
Date Out of EFGWB: 1/17/95

MEMORANDUM

SUBJECT: Calculation of trifluralin EEC's for Sugarcane and Soybeans
DP Barcode: D208589

TO: Anthony F. Maciorowski, Ph.D.
Branch Chief
Ecological Effects Branch

FROM: Siroos Mostaghimi, Ph.D., Environmental Engineer
Surface Water Section
Environmental Fate and Ground Water Branch

THROUGH: Henry Nelson, Ph.D., Section Head
Surface Water Section
Environmental Fate and Ground Water Branch

Henry Jacoby, Branch Chief
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division

SUMMARY

This report summarizes the Tier II EEC's for Trifluralin (Treflan), a,a,a-Trifluoro-2-6-dinitro-N,N-dipropyl-p-toluidine for sugarcane and soybeans.

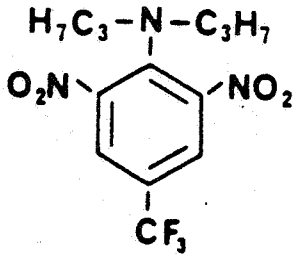

Figure 1. Molecular structure of trifluralin

Tier II EEC uses a single high exposure site for each pesticide use of interest. The weather and agricultural practices are simulated at the sites for 36 years (the Illinois site used for simulation has only 19 years of weather data) so that the probability of an EEC occurring at these sites can be estimated.

PRZM 2 and EXAMS II were used to generate the EEC's.

The pesticide is applied to the soil. PRZM2 and EXAMS II were use to generate the EEC's.

Assumptions for ground application of trifluralin to sugarcane and corn include:

1. At the application time 95% of the chemical applied reached the field.

2. 1 % of the applied trifluralin reached surface water at the application time.

3. The other 4 % either remained airborne or deposited on the ground beyond the pond.

4. Since only one aerobic and one anaerobic soil metabolism study was conducted for this chemical, the reported results were multiplied by the uncertainty factor of 3 for use in the PRZM2 and EXAMS files. The K_{oc} used for this modeling is the K_{oc} reported by USDA data for this chemical in the EFGWB oneliner.

V

Table 1 shows the trifluralin use for sugarcane in Louisiana and soybeans in Illinois. The 1 in 10 year maximum initial, 96 hour acute, 21 day chronic, maximum 60 day and maximum 90 day average dissolved trifluralin concentrations are reported in this Table. The chemical characteristics, management practices, locations and EEC modeling summary for sugarcane and soybeans are shown in Tables 2 to 5 of this report.

Figures 2 and 3 show the annual exceedence probability of EEC's for trifluralin on sugarcane in Louisiana and soybeans in Illinois sites, respectively. Annual maximum initial, 96 hour, 21 day, 60 day and 90 day concentrations are the highest average concentrations over the given period which occurred during the year. For sugarcane, 45% of the trifluralin was carried to surface water dissolved in runoff while 26% was carried on eroded sediments. Twenty-eight percent of the trifluralin was carried by spray drift. For soybeans in Illinois site, 40% of the trifluralin was carried to surface water dissolved in runoff while the sediments carried 22% of the chemical. The spray drift had a larger impact on this site and carried 38% of the trifluralin. These data indicate that the mitigation practices that affect the runoff volume, the amount of eroded sediments and the amount of spray drift can be effective in reducing trifluralin transport to aquatic environments.

The soils selected for modeling are class C (moderately high runoff potential) and represents high exposure but a reasonable sites. The average amount of rainfalls were 58 and 33 inches per year for Louisiana and Illinois sites, respectively. The rate used for the modeling is the highest rate recommended on the label.

The total annual runoff (dissolved plus bound) of trifluralin (Treflan) from the fields for the year closest to the upper 10th percentile are:

Site	Year	Total Annual Runoff (Kg/Ha)	% of Annual Application
Louisiana	1969	0.001538	0.034
Illinois	1950	0.009353	0.417

Table 1. Estimated Environmental Concentrations (EEC's) for trifluralin. Results reported are 1 in 10 year maximum values with 1 % spray drift.

Crop	Application Method	Applica. Rate lb a.i/Acre (Number of Applications)	Max Initial EEC (PPB)	4 DAY EEC (PPB)	21 DAY EEC (PPB)	60 DAY EEC (PPB)	90 DAY EEC (PPB)
Sugarcane, Louisiana	Ground	2.0 (2)	3.44	2.06	0.78	0.49	0.39
Soybeans, Illinois	Ground	2.0 (1)	2.89	2.01	0.81	0.41	0.31

TABLE 2. TRIFLURALIN CHARACTERISTICS, LOCATION AND MANAGEMENT PRACTICES FOR **SUGARCANE**

Modeler:	Siroos Mostaghimi
Runoff Model:	PRZM2
Receiving Water Model:	EXAMS 2.94
CHEMICAL	
Common Name:	Trifluralin (Treflan)
Formulation:	Wettable Powder
Parameters:	
Hydrolysis $T_{1/2}$:	
pH 5, 7 and 9	Stable
K_{oc}:	8000 Liter/Kg
Aqueous Photolysis $T_{1/2}$:	0.37 Days
Aerobic Soil $T_{1/2}$:	345 Days
Anaerobic soil $T_{1/2}$:	177 Days
Solubility:	0.30 mg/L
Vapor Pressure:	1.10 E-4 Torr
Henry's Law Constant:	1.62 E-4 Atm. M^3/Mol
LOCATION:	
Crop:	Sugarcane
MLRA:	O-134
Soil Series:	Commerce
Texture:	Silt Loam
County:	Lafayette
State:	Louisiana
Justification:	Reasonable high exposure
MANAGEMENT:	
Tillage Type:	Conventional
Application Method:	Ground applied and incorporated into 3 inches
Percent Spray drift:	1 %
Planting Date:	5/1
Emergence Date:	5/11
Maturity Date:	9/1
Harvest Date:	10/1

TABLE 3. MODELING RESULTS FOR APPLICATION OF TRIFLURALIN ON **SUGARCANE** IN LOUISIANA.

PESTICIDE APPLICATION:	
Application Rate:	4.0 lb ai/Acre
Application date(s):	9/15 and 4/15
Justification:	Maximum rate on the label
RESULTS:	
10 Year Return (10% Exceedence)	
Initial:	3.44 µg/L
96 Hour (acute):	2.06 µg/L
21 Day (chronic):	0.78 µg/L
60 Day max:	0.49 µg/L
90 day max:	0.39 µg/L
Average Yearly Rainfall:	147.2 cm
Average Yearly Runoff:	41.8 cm
Average Erosion Rate:	52.7 Mg/Ha
LOADING BREAKDOWN:	
Runoff:	45.6 %
Erosion:	26.2 %
Spray Drift:	28.1 %

TABLE 4. TRIFLURALIN CHARACTERISTICS, LOCATION AND MANAGEMENT PRACTICES FOR **SOYBEANS**

Modeler:	Siroos Mostaghimi
Runoff Model:	PRZM2
Receiving Water Model:	EXAMS 2.94
CHEMICAL	
Common Name:	Trifluralin (Treflan)
Formulation:	Wettable Powder
Parameters:	
Hydrolysis $T_{1/2}$:	
pH 5, 7 and 9	Stable
K_{oc}:	8000 Liter/Kg
Aqueous Photolysis $T_{1/2}$:	0.37 Days
Aerobic Soil $T_{1/2}$:	345 Days
Anaerobic soil $T_{1/2}$:	177 Days
Solubility:	0.30 mg/L
Vapor Pressure:	1.10 E-4 Torr
Henry's Law Constant:	1.62 E-4 Atm. M^3/Mol
LOCATION:	
Crop:	Soybeans
MLRA:	M-108
Soil Series:	Hosmer
Texture:	Silt Loam
County:	Christian
State:	Illinois
Justification:	Reasonable high exposure
MANAGEMENT:	
Tillage Type:	Conventional
Application Method:	Ground applied and incorporated into 3 inches
Percent Spray drift:	1 %
Planting Date:	5/1
Emergence Date:	5/11
Maturity Date:	9/1
Harvest Date:	10/1

TABLE 5. MODELING RESULTS FOR APPLICATION OF TRIFLURALIN ON **SOYBEANS** IN ILLINOIS.

PESTICIDE APPLICATION:	
Application Rate:	2.0 lb ai/Acre
Application date(s):	6/1
Justification:	Maximum rate on the label
RESULTS:	
10 Year Return (10% Exceedence)	
Initial:	2.89 μg/L
96 Hour (acute):	2.01 μg/L
21 Day (chronic):	0.81 μg/L
60 Day max:	0.41 μg/L
90 day max:	0.31 μg/L
Average Yearly Rainfall:	83.3 cm
Average Yearly Runoff:	14.5 cm
Average Erosion Rate:	34.2 Mg/Ha
LOADING BREAKDOWN:	
Runoff:	39.9 %
Erosion:	21.7 %
Spray Drift:	38.3 %

Fig.2.Trifluralin Pond EEC(PRZM2-EXAMS)
Sugarcane on Commerce Silt Loam

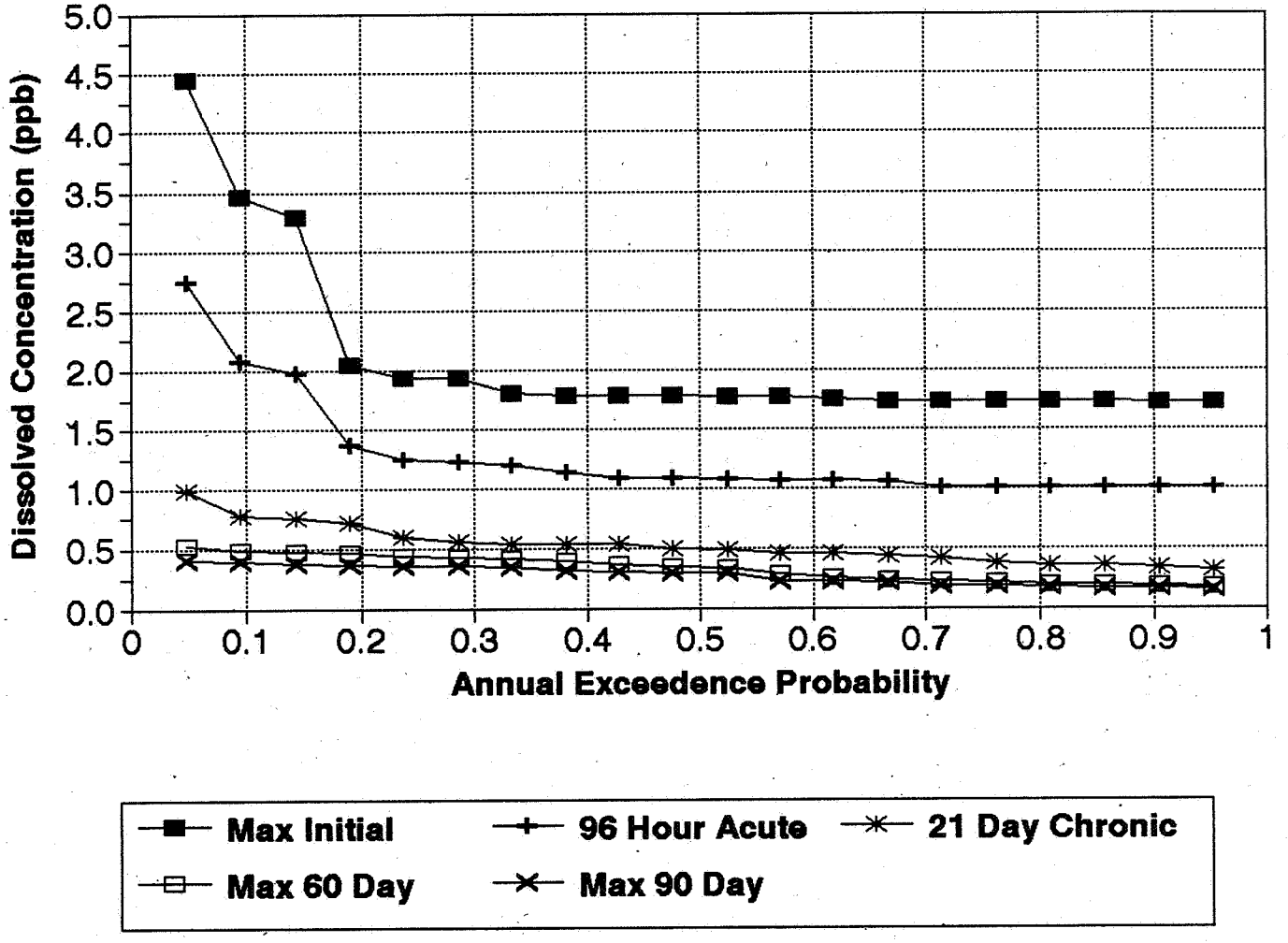

Fig.3.Trifluralin Pond EEC(PRZM2-EXAMS)
Soybeans on Hosmer Silt Loam