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MEMORANDUM

SUBJECT: Drinking Water Assessment for Tembotrione (Bayer 747)

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DATE: January 8, 2007

Attached is the drinking water assessment for tembotrione (Bayer 747), a new active ingredient to be used on corn.

For surface water sources, the highest peak concentration came from the Florida corn scenario (5.84 ppb). The highest yearly average and 30-year average results came from the North Dakota scenario (1.05 ppb and 0.72 ppb respectively).

The predicted ground water concentration, to be used for both acute and chronic assessments, is 0.0139 ppb.

Acknowledgement.

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I. Executive Summary

AE 0172747 (tembotrione) (2-[2-Chloro-4-(methylsulfonyl)-3-[(2,2,2-trifluoroethoxy) methyl] benzoyl]-1,3-cyclohexanedione) is a systemic herbicide under development, that is proposed for use on field corn, popcorn, and sweet corn in the United States. It belongs to the triketone chemical class of herbicides and provides broadleaf and grass control. The proposed use recommendation for this herbicide is for an application rate of 0.092 kg a.i./ha with a second treatment, if needed, 14 days following the first application. The applications should take place between crop emergence to the V8 developmental stage of corn. Tembotrione is broadcast applied using flat-fan nozzles that provide medium to coarse spray droplets. Tembotrione is formulated as a suspension concentrate that requires the use of an external adjuvant (methylated or ethylated seed oil) to enhance herbicidal activity and a nitrogen source such as urea ammonium nitrate. The formulation also contains the safener isoxadifen-ethyl to protect corn from injury. Tembotrione is a hydroxyphenyl pyruvate dioxygenase (HPPD) inhibitor that binds to the HPPD enzyme and inhibits the synthesis of carotene pigments.

A refined Tier II drinking water assessment for the Section 3 proposed use of tembotrione on corn was performed using PRZM/EXAMS modeling with index reservoir (IR) scenarios and percent

cropped area (PCA) adjustment factors. The assessment was based on the maximum proposed application rate and ground based spraying. The SCI-GROW model was used to estimate levels of AE 017247 that may reach ground water. Modeling was only performed for the parent compound since the major metabolite of tembotrione identified in soil and aquatic metabolism studies (AE 0456148) exhibits significantly lower toxicity and does not belong to the same toxicological class as compared to the parent. Other metabolites such as AE 1275213 (glutaric acid), occur in plant and animal tissues and is closely related to metabolites in the Krebs cycle. It is expected to degrade rapidly under microbial conditions and was not detected in the terrestrial field dissipation trials.

For ground based applications, the maximum acute drinking water concentration in surface water (1-in-10 year annual peak concentration) of tembotrione is not expected to exceed **5.84 µg/L**; the chronic noncancer drinking water concentration (1-in-10 year annual average concentration) is not expected to exceed **1.05 µg/L**; the chronic cancer drinking water concentration (30-year annual average) is not expected to exceed **0.72 µg/L**. The SCI-GROW model estimated the concentration of tembotrione in shallow ground water as **0.0139 µg/L**.

The environmental fate and transport properties of tembotrione are well characterized; however, fate data are not available for all the metabolites. In addition, no foliar dissipation studies have been conducted. Since this is a new herbicide, no monitoring data are available for comparison with estimated levels derived from the models.

II. Problem Formulation

This is a Tier II drinking water assessment that uses modeling and available monitoring data to estimate the ground water and surface water concentrations of pesticides in drinking water source water (pre-treatment) resulting from pesticide use on sites that are highly vulnerable. This initial tier screens out chemicals with low potential risk and provides estimated exposure concentrations for the human health dietary risk assessment.

III. Analysis

A. Use Characterization

The proposed label specifies that tembotrione is a ground applied post emergence herbicide intended for the control of annual broadleaf and grass weeds on field corn, silage corn, popcorn, sweet corn, and corn grown for seed. Tembotrione is a suspension concentrate that requires the use of an external adjuvant. Weed growth ceases within hours after application. Symptoms on susceptible weed species

progress from yellowing and bleaching to necrosis resulting in eventual plant death generally within 7 to 14 days after application. Best control of broadleaf weeds is achieved when weeds are less than 6 inches in height and actively growing. The proposed label specifies that the maximum application rate is 6 fluid oz/acre of tembotrione per growing season (or 0.164 lbs a.i./acre/growing season). According to the proposed label, the product is to be applied at a rate of 3 fluid oz/acre (0.082 lbs a.i./acre) per application with a 14 day minimum interval between applications. Two applications can be made per season. Tembotrione is intended for ground application as a foliar spray with nozzles that deliver “medium” spray droplets; this herbicide is not to be applied aerially. A summary of the use information is provided in **Table 1**.

Actual pesticide usage data are not available since this is a new chemical. Because this chemical is proposed for use on field corn, silage corn, popcorn, sweet corn, and corn grown for seed, the current geographic distribution of these crops is expected to be generally representative of potential tembotrione application areas. The growing areas throughout the United States of corn (excluding corn grown for seed) are shown in **Figure 1** in the Appendix. Data for the growing areas of seed corn are not available from the U.S. Department of Agriculture National Agriculture Statistics Service (NASS). Maps of individual corn crops are provided in Figures 2–5.

Table 1. Summary Use Information for AE 0172747 (Tembotrione) Based on Proposed Label						
Use	Single Application Rate (lbs a.i./acre)	Number of Applications	Seasonal Application Rate (lbs a.i./acre)	Interval Between Applications (days)	Application Method	Incorporation Depth (inches)
Field corn, silage corn, popcorn, sweet corn, and corn grown for seed	0.082	2	0.164	14	Ground spray	0

B. Fate and Transport

The environmental fate and transport properties of tembotrione are well characterized; however, data for its major degradation products are incomplete. The physical/chemical and fate properties of tembotrione are summarized in **Table 2**.

Table 2. Summary of Physical/Chemical and Environmental Fate Properties of AE 0172747 (Tembotrione)
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Parameter	Value	Source	Comment
Chemical name	2-[2-Chloro-4-(methylsulfonyl)-3-[(2,2,2-trifluoroethoxy)methyl]benzoyl]-1,3-cyclohexanedione		
Molecular weight	440.8	MRID 46695412	
Solubility	28.3 g/L (pH 7 and 20 °C)	MRID 46695412	
Vapor pressure	8.2×10^{-11} mm Hg	MRID 46695412	
Henry's Law Constant	1.69×10^{-15} atm-m ³ /mol		Calculated from vapor pressure and water solubility
Log K _{ow}	2.16 (pH = 2) -1.09 (pH = 7) -1.37 (pH = 9)	MRID 46695412	
pK _a	3.2	MRID 46695419	
Hydrolysis half-life	Stable	MRID 46695410	Stable at pH 5, 7, and 9
Aqueous photolysis half-life	172 days	MRID 46695411	Half-life corrected to represent natural sunlight at 33.36 °N latitude; uncorrected laboratory half-life of 56 days (continuous irradiation; xenon lamp).
Soil photolysis half-life	30 days	MRID 46695412 MRID 46695413	Half-life corrected to represent natural sunlight at 33.36 °N latitude; uncorrected average laboratory half-life of 8.45 days (continuous irradiation; xenon lamp).
Aerobic soil metabolism half-life	4.6 days (silt loam, Germany) 63 days (loamy sand, Germany) 14 days (sandy loam, Germany) 6 days (clay soil, Great Britain) 72.1 days (loamy sand, NC) 6.9 days (silt loam, ND)	MRID 46695414 MRID 46695415 MRID 46695415 MRID 46695415 MRID 46695416 MRID 46695416	Nonlinear half-lives
Anaerobic soil metabolism half-life	231 days 257 days	MRID 46695419 MRID 46695420	Half-life based on the total system (soil + water)
Aerobic aquatic metabolism half-life	168 days 62.4 days	MRID 46695421 MRID 46695422	Half-life based on the total system (sediment + water)
Anaerobic aquatic metabolism half-life	399 days (average value of 448 days and 351 days)	MRID 46695423 MRID 46695424	Half-life based on the total system (sediment + water)
Soil organic carbon partition coefficient (K _{oc})	32 (silt loam) 27 (sand loam) 131 (loamy sand) 20 (clay) 53 (silt loam) 130 (loamy sand) 379 (sandy loam sediment)	MRID 46695404 MRID 46695404 MRID 46695404 MRID 46695404 MRID 46695404 MRID 46695404 MRID 46695404	

Table 2. Summary of Physical/Chemical and Environmental Fate Properties of AE 0172747 (Tembotrione)

Parameter	Value	Source	Comment
Terrestrial field dissipation half-life	24.5 days (NY site)	MRID 46695425	
	25.3 days (IL site)	MRID 46695425	
	47.5 days (NE site)	MRID 46695425	
	5.9 days (CA site)	MRID 46695425	

Tembotrione is not expected to be persistent in the environment, degrading primarily through aerobic biodegradation and photolysis. Hydrolysis under acidic, neutral, and alkaline conditions does not appear to be an important environmental fate process.

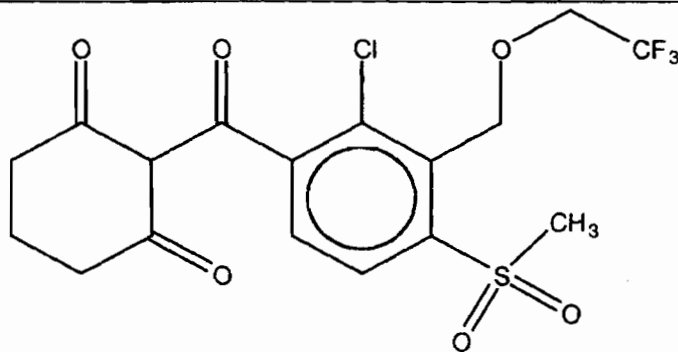
Given a Henry's Law constant of 1.69×10^{-15} atm-m³/mol and vapor pressure of 8.2×10^{-11} mm Hg, tembotrione is expected to be relatively nonvolatile from soil and water surfaces. It is noted that tembotrione partially exists in its enol form, which has a pK_a of 3.2. This pK_a indicates that the enol will exist as an anion under most environmental conditions (pH 5–9) and anions do not volatilize. Since tembotrione is not expected to partition to air, atmospheric transport of this herbicide will not be an important transport mechanism. Tembotrione is expected to possess high mobility in soils and may leach into ground water given an average K_{oc} value of 110 L/kg that was measured in six soils and a sediment from the U.S. and Europe. The relatively rapid rate of degradation of tembotrione may limit its leaching potential however. Adsorption/desorption studies were also conducted for the following metabolites of AE 0172747 (tembotrione): AE 0456148; AE 0941989; AE 0968400; AE 1124336; and AE 1392936. AE 0456148, AE 0968400, and AE 1392936 are all expected to possess high mobility in soils based upon the data and have the potential to leach into ground water. K_{oc} values of <1 to 3.65 L/kg were observed for AE 0456148 in five soils and K_{oc} values of 25 to 123 L/kg were observed for AE 0968400 in five soils. Almost no adsorption was observed for AE 1392936 in batch adsorption experiments using four soils, and all K_{oc} values were <1 for this metabolite (MRID 46695409). The mobility of metabolite AE 0941989 is considered moderate to low based upon K_{oc} values in the range of 400–1743 L/kg that were measured in four soils and the mobility of metabolite AE 1124336 is moderate given a K_{oc} range of 201–332 L/kg. It is noted that metabolites AE 1392936 and AE 0941989 were shown to biodegrade rapidly in aerobic soil metabolism studies, which may attenuate the potential of these compounds to leach into ground water.

The important metabolites formed by the degradation of tembotrione are provided in **Table 3** and the chemical structures of these metabolites are given in **Table 4**. Detailed summaries of the environmental fate studies are provided in Appendix A.

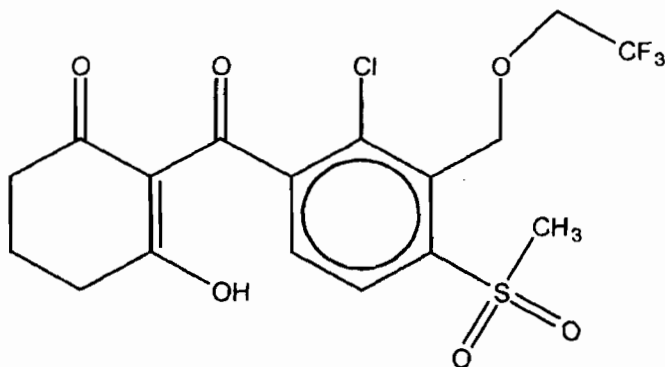
Table 3. Maximum Amounts of AE 0172747 (Tembotrione) Metabolites in Degradation Studies Characterized by Study Type

Study Type	Metabolite (% Maximum)	MRID
161-1 Hydrolysis	No degradation products observed	MRID 46695410
161-2 Aqueous photolysis	Glutaric acid (6.8%)	MRID 46695411
161-3 Soil photolysis	AE 0456148 (22%)	MRID 46695412
	AE 0941989 (15.3%)	MRID 46695412
	AE 0941989 (17.9%)	MRID 46695413
	glutaric acid (13.8%)	MRID 46695413
162-1 Aerobic soil metabolism	AE 0456148 (72.4%)	MRID 46695414
	AE 0968400 (14.4%)	MRID 46695414
	AE 0456148 (19.7–70.5%)	MRID 46695415
	AE 0968400 (14.9%)	MRID 46695415
	AE 1124336 (8.7%)	MRID 46695415
	AE 0456148 (25.8%)	MRID 46695416
	AE 1392936 (17.1%)	MRID 46695416
162-2 Anaerobic soil metabolism	AE 0968400 (7.3%)	MRID 46695416
	AE 1124336 (1.1%)	MRID 46695416
	CO ₂ was the only significant degradation product.	MRID 46695419
162-3 Anaerobic aquatic metabolism	AE 0456148 (46.4%)	MRID 46695420
	AE 0456148 (2.4%)	MRID 46695423
162-4 Aerobic aquatic metabolism	AE 0456148 (61.6%)	MRID 46695421
	AE 0456148 (95.2%)	MRID 46695422
	AE 0968400 (4.4%)	MRID 46695422

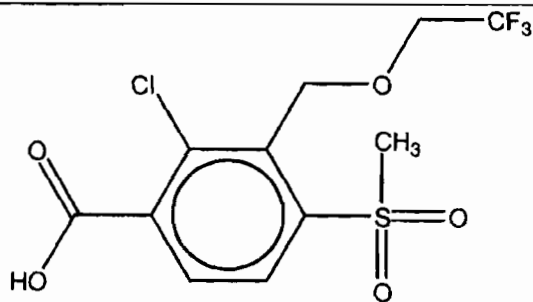
Table 4. The Chemical Structure of AE 0172747 (Tembotrione) and its Metabolites



AE 0172747 (Tembotrione - Dione form)

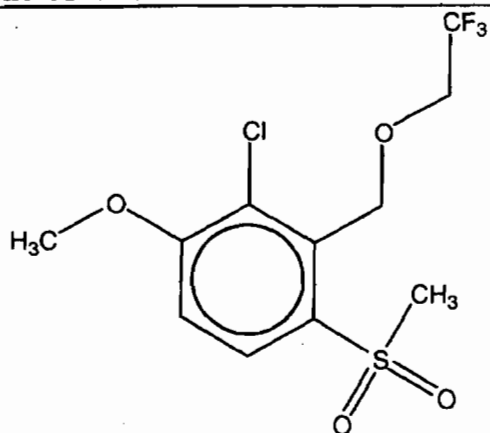


AE 0172747 (Tembotrione - Enol form)

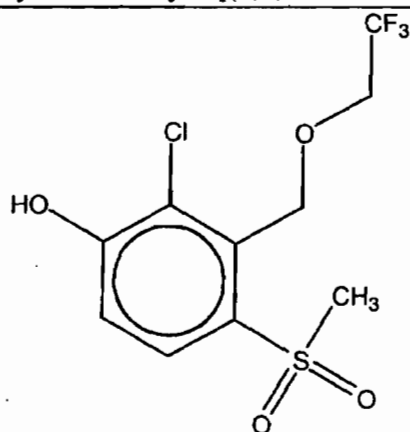


2-Chloro-4-mesyl-3-[(2,2,2-trifluoroethoxy)methyl]benzoic acid (AE 0456148)

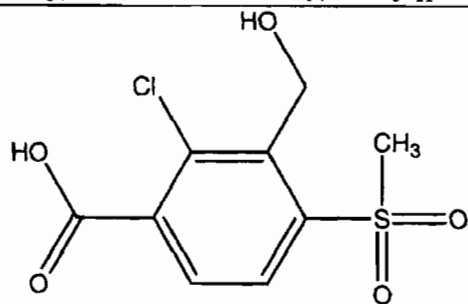
Table 4. The Chemical Structure of AE 0172747 (Tembotrione) and its Metabolites



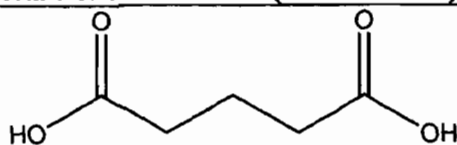
2-Chloro-4-mesy-1-methoxy-3-[(2,2,2-trifluoroethoxy)methyl]benzene (AE 1124336)



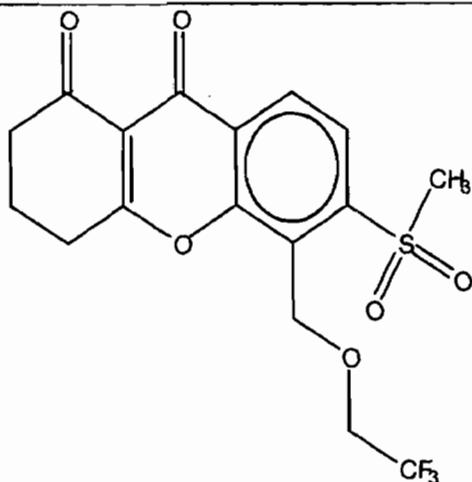
2-Chloro-4-mesy-3-[(2,2,2-trifluoroethoxy)methyl]phenol (AE 0968400)



2-Chloro-3-hydroxymethyl-4-mesybenzoic acid (AE 1392936)

Table 4. The Chemical Structure of AE 0172747 (Tembotrione) and its Metabolites

Glutaric acid (AE 1275213)



6-Methanesulfonyl-5-(2,2,2-trifluoroethoxymethyl)-3,4-dihydro-2H-xanthene-1,9-dione (AE 0941989)

C. Drinking Water Exposure Modeling

A Tier II drinking water assessment was performed using PRZM 3.12/EXAMS 2.98 modeling with index reservoir (IR) scenarios and percent cropped area (PCA) adjustment factors. The assessment was based on the proposed use of tembotrione on corn. Based on the environmental fate data for tembotrione, input parameters used for the PRZM/EXAMS models are shown in **Table 5**.

Table 5. PRZM/EXAMS Chemical Specific Input Parameters for AE 0172747 (Tembotrione)

Parameter	Input Value and Unit	Source
Maximum application rate	0.092 kg/ha	Product Label AE 0172747 (EPA No. 264-xxx)
Maximum number of applications	2	Product Label AE 0172747 (EPA Reg. No. 264-xxx)
Method of application (CAM = 1)	Ground spray	Product Label AE 0172747 (EPA Reg. No. 264-xxx)

Table 5. PRZM/EXAMS Chemical Specific Input Parameters for AE 0172747 (Tembotrione)

Parameter	Input Value and Unit	Source
Minimum interval between applications	14 days	Product Label AE 0172747 (EPA Reg. No. 264-xxx)
Application efficiency	0.99 (ground spray)	EFED Model Input Guidance, Version II (2002)
Spray drift	0.064 (ground)	EFED Model Input Guidance, Version II (2002) ^a
Partition coefficient K_{oc} ^b	110 mL/g	MRID 46695404
Application date	10 days post emergence	
Henry's Law constant	1.69×10^{-15} atm-m ³ /mol	Calculated from vapor pressure and water solubility
Hydrolysis	Stable	MRID 46695410
Aerobic soil metabolism ^c	46 days	MRID 46695414, MRID46695415, MRID 46695416
Aerobic aquatic metabolism ($t_{1/2}$) ^d	278 days	MRID 46695421, MRID 46695422
Anaerobic aquatic metabolism ($t_{1/2}$) ^e	1198 days	MRID 46695423, MRID 46695424
Aquatic photolysis $t_{1/2}$ (days)	172 days	MRID 46695411
Vapor pressure	8.2×10^{-11} mm Hg (20 °C)	MRID 46695412
Solubility in water (pH 7, 20 °C)	283000 mg/L (pH 7 and 20 °C)	MRID 46695412 (solubility x 10)
Molecular Weight	440.8	MRID 46695412
Percent cropped area	0.46 (corn)	USEPA 2003
^a Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides, Version II" dated February 28, 2002.		
^b Average K_{oc}		
^c 90% mean UCL calculated using half-lives of 4.6, 63, 14, 6, 72.1, and 6.9 days		
^d 90% mean UCL calculated using half-lives of 168 and 62.4 days		
^e 3 x 399.3 days		

Application dates for the different scenarios (CA corn; FL sweet corn; IL corn; MS corn; NC corn (east); NC corn (west); ND corn; OH corn; OR sweet corn; PA corn; TX corn), were based on the time it typically takes for corn to reach the V8 stage following emergence. The initial application was selected as 10 days after crop emergence, with a second application 14 days later.

The estimated 1-in-10 year drinking water concentrations (EDWC) are provided in **Table 6**.

Table 6. Estimated Drinking Water Concentrations (EDWCs) for AE 0172747 (Tembotrione) (ppb or µg/L) Obtained from PRZM/EXAMS Based on Ground Applications for Corn *

Scenario	Peak	Yearly	30 Year Average
California corn	0.39	0.21	0.16
Florida sweet corn	5.84	0.78	0.36
Illinois corn	2.36	0.83	0.49

Mississippi corn	2.10	0.58	0.28
North Carolina (East) corn	0.95	0.35	0.26
North Carolina (West) corn	2.90	0.80	0.41
North Dakota corn	2.05	1.05	0.72
Ohio corn	1.75	0.75	0.42
Oregon Sweet corn	0.67	0.21	0.12
Pennsylvania corn	1.05	0.48	0.29
Texas corn	2.16	0.66	0.32
* EECs multiplied by 0.46 Percent Cropped Area (PCA) factor for corn.			

The largest 1-in-10 year peak concentration occurs in the Florida sweet corn scenario. The field and meteorological data used for the PRZM scenario in Florida is located in Palm Beach County in Southeast Florida, although sweet corn production occurs throughout the state. The cumulative rainfall from this meteorological file is much greater than the total rainfall in any of the other PRZM corn scenarios, and as a consequence the runoff flux from this site is much greater than in any of the other PRZM scenarios. The large runoff flux results in higher loadings to adjacent water bodies and hence greater EECs. For comparison, the annual average rainfall from the Florida sweet corn scenario is 154.8 cm (70.0 inches), as compared to the California scenario which is located in Stanislaus/San Joaquin Counties in the Central Valley that receives on average about 44.6 cm (17.6 inches) rainfall annually and has the lowest EECs. Moreover, the rainy season in Southeast Florida typically runs through October, leading to large single event rainfalls during the expected application dates of tembotrione and large runoff events. Changing the application date from October 24 to November 24 in the Florida sweet corn scenario, resulted in EDWCs that were approximately one third of those shown in Table 6; however, using an initial application date of September 24, resulted in similar EDWCs as those shown in Table 6. Therefore, a great deal of variability can be expected in the EDWCs for Florida depending upon the application date. To further explore the impact of application date on the EDWCs a vulnerability assessment would be required.

Ground water concentrations were estimated using the Tier I model SCI-GROW (Screening Concentration in Ground Water) Version 2.3. SCI-GROW provides a ground water screening exposure value to be used in determining the potential risk to human health from drinking water contaminated with the pesticide. SCI-GROW is used as a screening tool to estimate pesticide concentrations found in ground water used as drinking water. SCI-GROW was developed by fitting a linear model to ground water concentrations with the Relative Index of Leaching Potential (RILP) as the independent variable. Ground water concentrations were taken from 90-day average high concentrations from Prospective Ground Water studies; the RILP is a function of aerobic soil metabolism and the soil-water partition coefficient. The output of SCI-GROW represents the concentrations that might be expected in shallow unconfined aquifers under sandy soils, which is representative of the ground water most vulnerable to pesticide contamination likely to serve as a

drinking water source. The input parameters for tembotrione used in SCI-GROW are illustrated in Table 7.

Table 7. SCI-GROW Input Parameters for AE 0172747 (Tembotrione)			
Property	Input Value	Comments	Source
Aerobic soil metabolism half-life	10.45 days	Median value for half-lives of 4.6, 6, 6.9, 14, 63, and 72.1 days.	MRID 46695410, MRID46695411, MRID 46695412
K_{oc}	20 mL/g	Lowest K_{oc} value was used since there is a greater than 3-fold variation in the values.	MRID 46695404
Application rate (lbs a.i./acre)	0.082		Product Label AE 0172747 (EPA Reg. No. 264-xxx)
Maximum number of application per season	2		Product Label AE 0172747 (EPA Reg. No. 264-xxx)

The estimated concentration of tembotrione in ground water was calculated as 0.0139 ppb. SCI-GROW concentrations in ground water are likely to be approached in only highly vulnerable aquifers, which constitute a very small percentage of drinking water sources, it is not appropriate to use SCI-GROW for national or regional exposure estimates. SCI-GROW estimates likely ground water concentrations if the pesticide is used at the maximum allowable rate in areas where ground water is exceptionally vulnerable to contamination. In most cases, a large majority of the use area will have ground water that is less vulnerable to contamination than the areas used to derive the SCI-GROW estimate. In addition, SCI-GROW was developed using K_{oc} values ranging from 32–180 L/kg and aerobic soil half-lives of 13–1000 days. Extrapolating beyond these values increases the uncertainty of the ground water EECs.

D. Monitoring Data

Monitoring data provide different kinds of information than modeling estimates. For example, monitoring data consist of actual information from the field, reflecting current use pattern and usually underestimating frequency of occurrence. Monitoring data does not always include peak values, and inputs for monitoring cannot be adjusted as modeled ones can. In addition, monitoring is often conducted for purposes other than characterizing exposure from a particular pesticide, and as a consequence is used to complement modeling rather than to refine it. In general, a useful interpretation of monitoring values requires in-depth assessment of the data; however since tembotrione is a new use chemical that has not been registered, no monitoring data exist at this time.

E. Drinking Water Treatment

A water treatment effects study, conducted by Bayer CropScience indicated that under typical water treatment conditions, which includes chlorination, tembotrione will be degraded to AE 0456148, and AE 1275213 and that a large portion (>90%) of the metabolite AE 0456148 is removed in the treatment process by an activated carbon filter (Ramanarayanan 2005). The time-series plots of estimated daily concentrations in the water body show that tembotrione does not tend to accumulate in the drinking water reservoirs.

IV. Conclusions

The environmental fate properties of tembotrione have been sufficiently studied by the registrant and there are no major data gaps for this herbicide, with the possible exception of foliar dissipation rates. The major assumptions in this assessment are primarily centered on the models that were employed to generate the EDWCs. The meteorological and hydrological components in PRZM/EXAMS are highly parameterized to certain areas and may not necessarily be reflective of the conditions throughout the country. Currently, crop sites for PRZM/EXAMS modeling are chosen to represent sites which produce high-end, but not unrealistic or worst-case, EDWC for that crop. The EDWCs in this analysis are accurate only to the extent that the site represents a hypothetical high-end exposure site. The greatest 1-in-10 year peak EDWC occurred for the Florida sweet corn scenario and this value is highly variable with the starting application date as discussed in Section C. Preliminary investigation however indicates that the application date chosen for modeling is most likely to result high-end exposure; however a sensitivity analysis would be required to fully characterize the impact of application timing on EDWCs. In addition, no foliar dissipation rate constant was used in the PRZM component, although it is likely that absorption and metabolism of tembotrione by foliage will reduce the amount that is available for runoff and erosion. The actual aquatic exposure concentrations of tembotrione are unlikely to be higher than these calculated values because of conservative assumptions used in the assessment.

V. References

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Appendix A

161-1. Hydrolysis

MRID 46695410 (Acceptable)

¹⁴C-labeled AE 0172747 ([cyclohexyl-U-¹⁴C]-labeled 2-[2-chloro-4-mesy-3-((2,2,2-trifluoroethoxy)methyl)benzoyl]cyclohexane-1,3-dione; tembotrione) was stable in pH 5, 7, and 9 sterile aqueous buffered solutions at 25 °C over the course of a 30-day incubation period. Over 96% of the applied radioactivity was recovered as undegraded tembotrione at all three pH values, and no degradation products were identified. In a preliminary experiment conducted at *ca.* 50 °C for 5 days, [¹⁴C]tembotrione was relatively stable, declining from averages of 97.8–99.1% of the applied radioactivity at time 0 to 94.3–94.8% at 5 days post application. This study is classified as acceptable.

161-2. Aqueous Photolysis

MRID 46695411 (Acceptable)

¹⁴C-labeled tembotrione (experiments conducted using labels at both the cyclohexyl and phenyl position) at a nominal concentration of 1.0 mg a.i./L and irradiated continuously using a UV-filtered xenon lamp for 10 days at 25 °C in aqueous pH 7 solution, degraded with a reviewer-calculated first-order linear half-life of 56 days (average of both label experiments) based on the continuous irradiation used in study. The intensity of the lamp was 640 W/m², and 7.79 hours of irradiation with the artificial light are approximately equivalent to one solar day in Phoenix, Arizona (33.36 °N latitude). Therefore, the environmental phototransformation half-life is expected to be *ca.* 172 days. No major transformation products were isolated from either the irradiated or dark control solutions. In the irradiated buffer solutions, the only minor transformation product that was identified was pentanedioic acid (glutaric acid) that reached a maximum 6.8% of the applied amount 10 days post application. No significant deviations from good scientific practices were noted and the study is acceptable.

161-3. Soil Photolysis

MRID 46695412 (Supplemental)

¹⁴C-labeled tembotrione (label applied at the phenyl moiety) applied at 1.33 mg/kg to a loamy sand soil (78% sand, 18% silt, 4% clay, pH 5.3, organic matter 2.1%) from North Carolina and irradiated continuously using a UV-filtered xenon lamp for 9 days at 20 ± 1 °C, degraded with a reviewer-calculated first-order linear half-life of 9.2 days based on the continuous irradiation used in study. The intensity of the lamp was 687 W/m², and 6.9 hours of irradiation with the artificial light are approximately equivalent to one solar day in Phoenix, Arizona (33.36 °N latitude). Therefore, the environmental phototransformation half-life of tembotrione applied to this soil surface is expected to be *ca.* 32 days. In the irradiated samples, two major transformation products were isolated. AE 0456148 (2-chloro-4-mesy-3-[(2,2,2-trifluoroethoxy)methyl]benzoic acid) averaged a maximum of 22.0% of the applied at 9 days post application. AE 0941989 (6-methanesulfonyl-5-(2,2,2-trifluoroethoxymethyl)-3,4-dihydro-2H-xanthene-1,9-dione) averaged a maximum of 15.3% of the applied at 3 days post application and decreased to 12.0% at 9 days. No minor transformation products were identified. In the dark controls, no major transformation products were isolated. The only minor transformation product was AE 0456148, which averaged a maximum of 5.9% of the applied at 9 days post application. No significant deviations from good scientific practices were noted; however, the study was terminated after only 9 days of continuous irradiation, at which time *ca.* 50% of the applied tembotrione remained undegraded and the major transformation product (AE 0456148) was continuing to increase. Subdivision N guidelines specify that a photodegradation study be conducted for 30 days (15 days if irradiation is continuous). Therefore, the study is classified as supplemental.

MRID 46695413 (Supplemental)

¹⁴C-labeled tembotrione (label applied at the cyclohexyl moiety) applied at 1.16 mg/kg to a loamy sand soil (78% sand, 18% silt, 4% clay, pH 5.3, organic matter 2.1%) from North Carolina and irradiated continuously using a UV-filtered xenon lamp for 9 days at 20 ± 1 °C, degraded with a reviewer-calculated first-order linear half-life of 7.7 days based on the continuous irradiation used in study. The intensity of the lamp was 687 W/m², and 6.9 hours of irradiation with the artificial light are approximately equivalent to 1 solar day in Phoenix, Arizona (33.36 °N latitude). Therefore, the environmental phototransformation half-life of tembotrione applied to this soil surface is expected to be *ca.* 29 days. In the irradiated samples, two major transformation products were isolated. AE 0941989 averaged a maximum of 17.9% of the applied at 1 day post treatment and decreased to 15.3% at 9 days. Glutaric acid (1,5-pentanedioic acid) averaged a maximum of 13.8% of the applied at 3 days post treatment and decreased to 11.1% at 9 days. No minor transformation products were identified. In the dark controls, no major transformation products were isolated and no minor transformation products were identified. No significant deviations from good scientific practices were noted; however, the study was terminated after only 9 days of continuous irradiation. Subdivision N guidelines specify that a photodegradation study be conducted for 30 days (15 days if irradiation is continuous). Therefore, the study is classified as supplemental.

162-1. Aerobic Soil Metabolism

MRID 46695414 (Supplemental)

¹⁴C-labeled tembotrione (experiments conducted using labels at both the cyclohexyl and phenyl position) was applied at 0.2 mg a.i./kg (150 g a.i./ha) to a silt loam soil (13.2% sand, 66.9% silt, 19.9% clay, pH 7.70, organic carbon 1.72%) from Germany for 120 days and maintained under aerobic conditions in the dark at 20 ± 2 °C and 45% of the maximum water holding capacity. Based on nonlinear regression analysis, the half-life of tembotrione (combined labels) was 4.6 days and the linear regressed half-life was 10.5 days (both labels). In the soil treated with [phenyl-U-¹⁴C]tembotrione, two major transformation products were isolated. 2-Chloro-4-mesy-3-[2,2,2-trifluoroethoxy)methyl]benzoic acid (AE 0456148) was a maximum 72.4% of the applied at 14 days post treatment and decreased to 21.9% at 35 days and 0.5% at 77 days. 2-Chloro-4-mesy-3-[2,2,2-trifluoroethoxy)methyl]phenol (AE 0968400) was a maximum 14.4% of the applied at 35 days post treatment and decreased to 1.4% at 77 days. The only minor transformation product identified was 2-chloro-4-mesy-1-methoxy-3-[2,2,2-trifluoroethoxy)methyl]benzene (AE 1124336), which was a maximum 2.6% of the applied. Uncharacterized [¹⁴C]residues totaled a maximum of 3.3% of the applied. In the soil treated with [cyclohexyl-U-¹⁴C]tembotrione, no major transformation products were isolated and no minor transformation products were identified. Mineralization proceeded rapidly with 77.3% of the applied dose evolved as ¹⁴CO₂ by day 120.

In a supplementary experiment, additional silt loam soil samples were treated with [phenyl-U-¹⁴C]tembotrione and incubated in the dark at 10 ± 2 °C for 224 days. Tembotrione dissipated with a nonlinear half-life of 15.3 days. [¹⁴C]tembotrione decreased from 94.8% of the applied at time 0 to 73.1% at 7 days, 36.4% at 21 days, and 1.2–1.8% at 120–224 days (study termination). Two major transformation products were isolated. AE 0456148 was a maximum 70.6% of the applied at 35 days post treatment and decreased to 0.8% at 182–224 days. AE 0968400 was a maximum of 23.3% of the applied at 120 days post treatment and decreased to 4.4% at 224 days. The minor transformation product AE 1124336 was a maximum of 4.4% of the applied. At 224 days post application, 41.2% of the applied had been evolved as ¹⁴CO₂ and volatile organics totaled <0.1%.

No significant deviations from good scientific practices were noted; however, it could not be determined if the German soil used in this study is comparable to soils found in a typical tembotrione use area in the United States and the study was classified as supplemental.

MRID 46695415 (Supplemental)

¹⁴C-labeled (phenyl moiety) tembotrione was applied at 0.2 mg a.i./kg (150 g a.i./ha) to a loamy sand soil (82.0% sand, 13.6% silt, 4.4% clay, pH 5.9, organic carbon 2.76%, CEC 7.4 meq/100 g), a sandy loam soil (57.9% sand, 31.4% silt, 10.7% clay, pH 7.4, organic carbon 1.33%, CEC 8.2 meq/100 g) from Germany for 365 days and in a clay soil (20.0% sand, 35.6% silt, 44.4% clay, pH 8.2, organic carbon 2.54%, CEC 12.5 meq/100 g) from Great Britain for up to 120 days under aerobic conditions in the dark at 20 ± 2 °C and 45% of the maximum water holding capacity. Tembotrione dissipated most slowly in the loamy sand soil (most acidic, lowest CEC) and most rapidly in the clay soil (most alkaline, highest CEC). The nonlinear half-lives were 63 days in the loamy sand soil, 14 days in the sandy loam soil, and 6 days in the clay soil. First-order linear half-lives were 144, 56, and 23 days, respectively. Three transformation products were identified. AE 0456148 was a major transformation product in all three soils (maximum concentrations 19.7–70.5% of the applied). AE 0968400 was a major transformation product in the clay soil (maximum 14.9% of applied) and a minor transformation product in the loamy sand and sandy loam soils. AE 1124336 was a minor transformation product in all three soils. At study termination (365 days, 120 days for clay soil), ¹⁴CO₂ totaled 45.9–57.2% of the applied.

No significant deviations from good scientific practices were noted; however, it could not be determined if the European soils used in this study are comparable to soils found in a typical tembotrione use area in the United States and the study was classified as supplemental.

MRID 46695416 (Acceptable)

The biotransformation of [phenyl-U-¹⁴C]- and [cyclohexyl-U-¹⁴C]-labeled tembotrione (radiochemical purity ≥98.8%) was studied in a loamy sand soil (77% sand, 20% silt, 3% clay, pH 6.3, organic carbon 1.6%) from NC and [phenyl-U-¹⁴C]tembotrione was studied in a silt loam soil (26% sand, 56% silt, 18% clay, pH 7.6, organic carbon 4.5%) from ND for up to 354 days under aerobic conditions in the dark at 25 ± 1 °C and 75% of field capacity. [¹⁴C]tembotrione was applied to the soils at a nominal rate of 0.2 mg a.i./kg. In the loamy sand soil from NC (combined labels), [¹⁴C]tembotrione decreased from an average 92.5–97.9% of the applied at time 0 to 42.9–51.1% at 30 days post treatment, 23.8–27.0% at 179 days, and 9.4–13.4% at 354 days (study termination). Based on nonlinear and linear regression analysis, tembotrione dissipated with half-lives of 72.1 and 131 days, respectively. In the silt loam soil from ND (phenyl label only), [¹⁴C]tembotrione decreased from an average 99.8% of the applied at time 0 to 63.1% at 3 days post treatment, 37.1% at 7 days, 9.6% at 30 days, 2.2% at 60 days, and was not detected thereafter (91–179 days). Based on nonlinear and linear regression analysis, tembotrione dissipated with half-lives of 6.9 and 11 days, respectively. No major transformation products were isolated from and no minor transformation products were identified in the loamy sand soil treated with [cyclohexyl-¹⁴C]tembotrione. In the soils treated with [phenyl-¹⁴C]tembotrione, four transformation products were identified. In the loamy sand from NC, AE 0456148 averaged a maximum of 25.8% of the applied at 270 days post treatment and decreased to 14.9% at 354 days (study termination). 2-Chloro-3-hydroxymethyl-4-mesylbenzoic acid (AE

1392936) averaged a maximum of 17.1% of the applied at 354 days post treatment. AE 0968400 was a maximum 6.1% of the applied at 179 days post treatment and AE 1124336 was a maximum 0.8%. In the silt loam soil, the only major transformation product was AE 0456148, which averaged a maximum of 29.9% of the applied at 7 days post treatment, decreased to 3.7% at 30 days, and was not detected after 60 days. The minor transformation product AE 0968400 averaged a maximum of 7.2–7.3% of the applied (3 and 30 days post treatment), AE 1124336 averaged a maximum of 1.1%, and AE 1392936 averaged a maximum of 3.5%. Unidentified [¹⁴C]residues totaled an average maximum of 1.7% of the applied.

This study is classified as acceptable. No significant deviations from good scientific practices were noted.

MRID 46695417 (Supplemental)

The biodegradation of the tembotrione metabolite AE 0941989 (6-methanesulfonyl-5-(2,2,2-trifluoroethoxymethyl)-3,4-dihydro-2H-xanthene-1,9-dione) was studied (application rate 0.13 mg a.i./kg) in two clay loam soils from England and a sandy loam soil from Germany for 119 days under aerobic conditions in the dark at 20 °C and 40–53% of the maximum water holding capacity. The behavior of AE 0941989 was very similar in the three soils. [¹⁴C]AE0941989 degraded rapidly in three soils, decreasing from an average of 68.67% of the applied at time 0 to 27.19–32.18% at 2 days post treatment, 1.87–4.44% at 14 days, and ≤0.38% at 62 days. Based on nonlinear regression analysis and using individual sampling points, the half-lives of AE 0941989 were determined to be 1.3–1.8 days in the three soils. First-order linear half-lives were 7.9 and 8.8 days in the two clay loam soils from England, and 15.0 days in the sandy loam soil from Germany. Since degradation products were not identified, the study is classified as supplemental.

MRID 46695418 (Supplemental)

The biodegradation of tembotrione metabolite 2-chloro-3-hydroxymethyl-4-mesybenzoic acid (AE 1392936) was studied (application rate 0.8 mg a.i./kg) in two clay loam soils from England and a sandy loam soil from Germany for 58 days under aerobic conditions in the dark at 20 °C and 50–55% of the maximum water holding capacity. [¹⁴C]AE 1392936 degraded rapidly in all three soils. In the two clay loam soils from England, [¹⁴C]AE 1392936 decreased from an average of 98.09–99.39% of the applied at time 0 to 11.71–28.93% at 21 days, the last sampling interval for the Flint Hall soil, and was ≤0.78% at 41 days, the last sampling interval for the Shelley Field soil. In the sandy loam soil from Germany, AE 1392936 decreased from 97.82% of the applied at time 0 to 4.11% at 41 days (last sampling interval). Based on nonlinear regression analysis and using individual sampling points, the half-lives of AE 1392936 were determined to be 7.6, 11.5, and 15.6 days, in the Flint Hall clay loam, Shelley Field clay loam, and Laacher Hof sandy loam soil, respectively. First-order linear half-lives were 6.7 days in the Flint Hall clay loam, 6.6 days in the Shelley Field clay loam, and 9.8 days in the Laacher Hof sandy loam soil, respectively. Since transformation products were not identified, the study is classified as supplemental.

162-2 Anaerobic Soil Metabolism

MRID 46695419 (Acceptable)

[Cyclohexyl-U-¹⁴C]-labeled tembotrione applied at 0.134 mg a.i./kg was studied in a silt loam soil (15% sand, 62% silt, 23% clay, pH 8.3, organic carbon 1.3%) from Germany for 5 days under aerobic conditions (45% of maximum water holding capacity), followed by 120 days under anaerobic conditions (flooding plus nitrogen gas; 125 days total) in dark at 20 ± 1 °C. The dissipation of [¹⁴C]tembotrione slowed significantly after flooding; tembotrione decreased by *ca.* 40% of the applied in the 5 days of aerobic incubation and but by only *ca.* 16% during 120 of anaerobic incubation. [¹⁴C]tembotrione decreased from an average of 93.3% of the applied amount at time 0 to 62.5% of the applied at 5 days post treatment (final sampling interval prior to flooding). Immediately after flooding the system, the concentration of [¹⁴C]tembotrione in the total system (water + soil) averaged 62.0% of the applied, with 37.5% associated with the water and 24.5% associated with the soil. Total [¹⁴C]tembotrione averaged 62.0–65.2% of the applied at 0–15 days post flooding, 56.4–60.1% at 30 and 60 days, and 48.8–48.9% at 91 and 120 days (study termination). After flooding, the concentration of [¹⁴C]tembotrione in the water was a maximum of 46.6% of the applied at 7 days post flooding, then decreased to 21.1–21.4% at 91–120 days. In the flooded soil, [¹⁴C]tembotrione was a maximum of 36.1% of the applied at 60 days post flooding, then decreased to 27.5% at 120 days. Half-lives were not determined during the aerobic incubation period. Based on nonlinear regression analysis and using individual sample data (post flooding data only), tembotrione dissipated with a half-life of 231 days in the total system. Based on first-order linear regression analysis, the half-life in the total system was estimated to be 301 days. The only significant

transformation product identified was carbon dioxide. No significant deviations from good scientific practices were noted and the study is acceptable.

MRID 46695420 (Acceptable)

[Phenyl-U-¹⁴C]-labeled tembotrione applied at 0.138 mg a.i./kg was studied in a silt loam soil (15% sand, 62% silt, 23% clay, pH 8.3, organic carbon 1.3%) from Germany for 5 days under aerobic conditions (45% of maximum water holding capacity), followed by 120 days under anaerobic conditions (flooding plus nitrogen gas; 125 days total) in dark at 20 ± 1 °C. The dissipation of [¹⁴C]tembotrione slowed significantly after flooding; tembotrione decreased by *ca.* 45% of the applied in the 5 days of aerobic incubation but by only *ca.* 14% during 120 of anaerobic incubation. [¹⁴C]tembotrione decreased from an average of 96.4% of the applied amount at time 0 to 51.4% of the applied at 5 days post application (final sampling interval prior to flooding). Immediately following flooding, the concentration of [¹⁴C]tembotrione in the total system (water + soil) averaged 49.6% of the applied, with 27.9% associated with the water and 21.7% associated with the soil. Total [¹⁴C]tembotrione increased to an average 56.0% of the applied at 1 day post flooding, ranged from 45.2–50.1% at 3–59 days, and was 33.8% at 90 days, and 41.0% at 120 days (study termination). After flooding, the concentration of [¹⁴C]tembotrione in the water was a maximum of 39.9% of the applied at 1 day post flooding, then decreased to 16.3% at 120 days. In the flooded soil, [¹⁴C]tembotrione was a maximum of 24.8% at 120 days post flooding. Half-lives were not calculated for the aerobic portion of the study because data were collected at only two sampling intervals. The linear and nonlinear half-life of tembotrione in the total system was 257 days. The only major transformation product identified was AE 0456148, which was 40.2% of the applied at 5 days post treatment, increased to a maximum of 46.4% at 30 days post flooding (41.6% in water and 4.8% in soil), and was 41.6% at 120 days (35.6% in water, 6.0% in soil). No minor transformation products were identified. No significant deviations from good scientific practices were noted and the study is acceptable.

162-3 Anaerobic Aquatic Metabolism

MRID 46695423 (Acceptable)

[Phenyl-U-¹⁴C]-labeled tembotrione was applied at 0.03 mg a.i./kg to a pond water/silty clay sediment system (water pH 7.5, dissolved organic carbon 11.7%, sediment pH 7.0, organic carbon 1.1%) from Kansas for 365 days in dark at 20 ± 1 °C. In the total system, tembotrione decreased from an average of 99.1% of the applied amount at time 0 to 54.6% at 365 days post treatment (study termination). In the water, [¹⁴C]tembotrione decreased from an average of 96.6% of the applied at time 0 to 51.2% at 15 days post treatment and 31.9–32.5% at 182–365 days. In the sediment, [¹⁴C]tembotrione increased from an average of 2.5% of the applied at time 0 to a maximum of 27.1%

at 91 days post treatment, then declined to 22.3% at 365 days. Based on nonlinear regression analysis and using individual data, [¹⁴C]tembotrione dissipated with a half-life of 448 days in the total system, 168 days in the water, and 1105 days in the sediment. Linear half-lives were 533, 289, and 1155 days, respectively. No major transformation products were isolated. The only minor transformation product identified was [¹⁴C]AE 0456148, which was a maximum average of 2.4% in the total system (2.4% in water, 1.4% in sediment). The study was classified as acceptable.

MRID 46695424 (Acceptable)

[Cyclohexyl-U-¹⁴C]-labeled tembotrione was applied at 0.03 mg a.i./kg to a pond water/silty clay sediment system (water pH 7.5, dissolved organic carbon 11.7%, sediment pH 7.0, organic carbon 1.1%) from Kansas for 269 days in dark at 20 ± 1 °C. In the total system, [¹⁴C]tembotrione decreased from an average of 98.5% of the applied at time 0 to 52.6–55.6% at 181–269 days post treatment (study termination). In the water, [¹⁴C]tembotrione decreased from an average of 97.1% of the applied at time 0 to 49.2% at day 14, and was 31.1–33.9% at 120–269 days post treatment. In the sediment, [¹⁴C]tembotrione increased from an average of 1.4% of the applied at time 0 to a maximum of 25.3% at 62 days, then declined slightly to 23.0% at 269 days. Based on nonlinear regression analysis and using individual data, [¹⁴C]tembotrione dissipated with a half-life of 351 days in the total system, 151 days in the water, and 1141 days in the sediment. Linear half-lives were 408, 239, and 1155 days, respectively. No major or minor transformation products were identified. This study is classified as acceptable.

162-4 Aerobic Aquatic Metabolism

MRID 46695421 (Acceptable)

The aerobic biotransformations of [cyclohexyl-U-¹⁴C]- and [phenyl-U-¹⁴C]-labeled tembotrione applied at 0.06–0.08 mg/L to a river water/silt loam sediment system (water pH 7.1, dissolved organic carbon 3 mg/L; sediment, pH 5.9, organic carbon 4.2%) from Germany for 365 days in dark at 20 ± 2 °C was studied. In the total system (water + sediment, combined data), [¹⁴C]tembotrione decreased from 98.3–103.6% of the applied radioactivity at time 0 to 66.1–66.8% at 139 days post treatment and 16.6–21.9% at 365 days. In the water, [¹⁴C]tembotrione decreased from 97.3–102.8% of the applied amount at time 0 to 42.8–46.5% at 19 days post treatment, 22.7–25.2% at 32 days, 4.2–4.6% at 165 days, and 1.9–2.4% at 365 days. In the sediment, [¹⁴C]tembotrione increased from 0.8–1.0% at time 0 to a maximum of 59.0–68.1% of the applied amount at 77–139 days post treatment, then declined to 14.8–19.5% at 365 days. Based on nonlinear regression analysis, the half-lives of [¹⁴C]tembotrione (combined radiolabels) were 168 days in the total system (water + sediment), 17 days in the water, and 143 days in sediment. Linear half-lives were 165 days in the total system, 64 days in the water, and 148 days in sediment. No major transformation products were

isolated from the samples treated with the cyclohexyl label. The only major transformation product isolated from the samples treated with the phenyl label was AE 0456148, which was a maximum of 61.6% of the applied in the total system (39.5% in water, 22.1% in sediment) at 365 days post treatment. No minor transformation products were identified. No significant deviations from good scientific practices were noted and the study was acceptable.

MRID 46695422 (Acceptable)

The aerobic biotransformations of [cyclohexyl-U-¹⁴C]- and [phenyl-U-¹⁴C]-labeled tembotrione applied at 0.06–0.07 mg/L to a river water/sand sediment system (water pH 7.7, dissolved organic carbon 1.8 mg/L, sediment pH 7.1, organic carbon 0.45%) from Germany for 175 days in dark at 20 ± 2 °C was studied. In the total system (water + sediment), [¹⁴C]tembotrione decreased from 104.2–106.3% of the applied at 0–1 days post treatment to 61.8–71.1% at 64 days, 39.3–49.1% at 83 days, 12.4–28.7% at 119 days, and 2.9–13.2% at 175 days. In the water, [¹⁴C]tembotrione decreased from 103.6–105.9% of the applied at time 0 to 60.8–62.9% at 42 days post treatment, 14.1–15.0% at 105 days, and 0.8–8.6% at 175 days. In the sediment, [¹⁴C]tembotrione increased from 0.4–0.6% of the applied at time 0 to a maximum of 25.2–28.2% at 29–42 days post treatment, then decreased to 16.3–17.3% at 83 days and 2.2–4.6% at 175 days. Based on nonlinear analysis, the half-lives of [¹⁴C]tembotrione (combined radiolabels) were 62.4 days in the total system (water + sediment), 44.7 days in the water, and 43.9 days in sediment. Linear half-lives were 41.5 days in the total system, 33.0 days in the water, and 38.1 days in sediment. The only identified transformation products were associated with the phenyl label. In the samples treated with [cyclohexyl-¹⁴C]tembotrione, no major transformation products were isolated and no minor transformation products were identified. In the samples treated with [phenyl-¹⁴C]tembotrione, the only major transformation product detected was AE 0456148, which was a maximum of 95.2% of the applied at 141 days post treatment (76.0% in water, 19.2% in sediment) and decreased slightly to 90.2% at 175 days (70.8% in water, 19.5% in sediment). The only minor transformation product that was identified was AE 0968400, which was a maximum 4.4% of the applied (3.0% in water, 1.4% in sediment) at 175 days post treatment.

163-1 Adsorption/Desorption

MRID 46695404 (Supplemental)

The adsorption and desorption properties of tembotrione in six soils and a sediment along with the physical characteristics of the soils are summarized in **Table A-1**. The adsorption phase of the study was carried out by equilibrating air-dried soils with [phenyl-U-¹⁴C]tembotrione at nominal test concentrations of 0.013, 0.13, 0.33, 0.67, and 1.33 mg a.i./kg soil for the SLS silt loam, SL2.3 sandy loam, Flint Hall loamy sand, EFS-138 silt loam, and EFS-139 loamy sand soils; 0.02, 0.2, 0.5, 1.0, and 2.0 mg a.i./kg soil for the LS2.2 and EFS-139 loamy sand soils; and 0.06, 0.6, 1.5, 3.0, and 6.0

mg a.i./kg soil for the EFS-142 sandy loam sediment. The samples were shaken in the dark at 20 ± 2 °C for 24 hours. The equilibrating solution used was 0.01M CaCl₂ solution, with soil/solution ratios ranging from 2–9:12 (w:v) for all test soils. The desorption phase of the study was carried out by replacing the adsorption solution with an equivalent amount volume of pesticide-free 0.01M CaCl₂ solution and equilibrating in the dark at 20 ± 2 °C for 24 hours. For all test soils, one desorption cycle was conducted for the desorption phase. After 24 hours of equilibration, 28.1–42.3%, 19.7–30.1%, 66.4–76.9%, 30.3–44.1%, 64.1–67.0%, 49.2–59.9%, and 86.4–90.8% of the applied [phenyl-¹⁴C]tembotrione was adsorbed to the SLS silt loam, SL2.3 sandy loam, LS2.2 loamy sand, Flint Hall clay, EFS-138 silt loam, EFS-139 loamy sand, and EFS-142 sandy loam, respectively. Registrant-calculated Freundlich adsorption K_f values were 0.54, 0.35, 3.62, 0.51, 2.40, 2.09, and 47.4 for the SLS silt loam, SL2.3 sandy loam, LS2.2 loamy sand, Flint Hall clay, EFS-138 silt loam, EFS-139 loamy sand, and EFS-142 sandy loam, respectively; corresponding Freundlich adsorption K_{oc} values were 32, 27, 131, 20, 53, 130, and 379. At the end of the desorption phase, 20.8–38.0%, 31.7–43.6%, 12.6–21.8%, 19.0–30.1%, 0.7–3.2%, 17.0–32.2%, and 2.3–7.5% of the applied [phenyl-¹⁴C]tembotrione desorbed from the SLS silt loam, SL2.3 sandy loam, LS2.2 loamy sand, Flint Hall clay, EFS-138 silt loam, EFS-139 loamy sand, and EFS-142 sandy loam, respectively. Registrant-calculated Freundlich desorption K_f values were 1.62, 1.60, 6.02, 2.20, 14.3, 3.48, and 45.1 for the SLS silt loam, SL2.3 sandy loam, LS2.2 loamy sand, Flint Hall clay, EFS-138 silt loam, EFS-139 loamy sand, and EFS-142 sandy loam, respectively; corresponding Freundlich desorption K_{oc} values were 95, 123, 218, 87, 318, 218, and 361.

Table A-1. Adsorption and Desorption Properties of AE 0172747 (Tembotrione) in Six Soils and a Sediment							
Textural Classification	SLS Silt Loam	SL2.3 Sandy Loam	LS2.2 Loamy Sand	Flint Hall Clay	EFS-138 Silt Loam	EFS-139 Loamy Sand	EFS-142 Sandy Loam Sediment
% Sand	13.2	57.9	82.0	20.0	26.0	77.0	71.0
% Silt	66.9	31.4	13.6	35.6	56.0	20.0	24.0
% Clay	19.9	10.7	4.4	44.4	18.0	3.0	5.0
% Organic carbon	1.7	1.3	2.8	2.5	4.5	1.6	12.5
% Organic matter	2.9	2.3	4.7	4.4	7.8	2.7	21.8
CEC mEq/100g	12.8	8.2	7.4	12.5	27.8	5.6	13.8
pH (soil:water)	7.7	7.4	5.6	7.8	7.6	6.3	6.0
Adsorption Phase							
K_f	0.54	0.35	3.62	0.51	2.4	2.09	47.4
K_{oc}	32.0	27.0	131.0	20.0	53.0	130.0	379
Desorption Phase							
K_f	1.62	1.6	6.02	2.2	14.3	3.48	45.1
K_{oc}	95.0	123.0	218.0	87.0	318.0	218.0	361.0
CEC = Cation exchange capacity							

The range of K_{oc} values suggest that tembotrione will have high to moderate mobility in soil, with the potential to leach. There was no soil with organic carbon content less than 1%, and the study was classified as supplemental.

MRID 46695405 (Supplemental)

The adsorption/desorption characteristics of [^{14}C]-labeled AE 0456148 were studied in a sandy loam soil and a silt loam from the U.S., and a loamy sand, a sandy loam soil, and a silt loam soil, each from Germany, in a batch equilibrium experiment. The soil characteristics and the adsorption/desorption data are summarized in Table A-2.

Table A-2. Adsorption and Desorption Properties of the Tembotrione Metabolite AE 0456148 in Five Soils					
Property	Speyer 2.2	Speyer 2.3	Sarotti	Pikeville	Horse Camp Bridge
Soil texture (USDA)	Loamy Sand	Sandy Loam	Silt Loam	Sandy Loam	Silt Loam
% Sand (50–2000 μm)	86.56	67.38	19.61	75.80	15.26
% Silt (2–50 μm)	8.73	24.22	61.20	19.25	61.18
% Clay (<2 μm)	4.71	8.41	19.20	4.95	23.56
pH					
Deionized water	6.6	6.9	7.4	6.7	7.4
1M KCl	5.9	6.6	7.6	5.7	7.6
0.01M CaCl_2	6.0	6.4	7.1	5.9	7.2
Organic carbon (%)	1.5	1.1	1.5	1.0	4.0
Organic matter (%)	2.6	1.9	2.6	1.7	6.9
CEC (meq/100 g)	7.7	5.7	12.9	5.6	20.9
Moisture at 1/3 bar (%)	12.6	19.3	31.9	11.4	53.3
Adsorption Phase					
K_f	0.01	0.04	0.00	3.63	1.7
K_{oc}	0.70	3.65	0.07	0.04	0.07
Desorption Phase					
K_f	0.18	0.83	0.04	0.55	0.28
K_{oc}	12.09	75.04	2.98	54.99	7.06
CEC = Cation exchange capacity					

The mobility of AE 0456148 is very high based upon the adsorption data from this study.

MRID 46695406 (Supplemental)

The adsorption/desorption characteristics of the tembotrione metabolite AE 0941989 were studied in a loamy sand soil and a sandy loam soil, each from Germany, and two clay loam soils from the United Kingdom, in a batch equilibrium experiment. The physical characteristics of the soils and the adsorption/desorption data are provided in **Table A-3**.

Property	Speyer 2.2 03/24 Loamy sand	Flint Hall 04/13 Clay Loam	Shelley 04/31 Clay Loam	Laacherhof AXXa 04/32 Sandy Loam
Soil texture (USDA)	Loamy Sand	Clay Loam	Clay Loam	Sandy Loam
% Sand	86.56	32.32	28.32	72.51
% Silt	8.73	34.52	41.86	16.85
% Clay	4.71	33.15	29.82	10.63
pH				
Deionized water	6.6/NA	8.3/7.9	7.9/7.5	7.5/7.3
1M KCl	6.0/NA	7.4/7.1	7.0/7.0	7.0/6.8
0.01M CaCl ₂	5.9/NA	7.8/7.5	7.1/7.1	7.3/7.2
Organic carbon (%)	1.6	2.5	2.1	1.7
Organic matter (%)	2.8	4.3	3.6	2.9
CEC (meq/100 g)	7.7	16.6	11.6	7.6
Moisture at 1/3 bar (%)	12.6	28.5	30.9	15.0
Adsorption Phase				
K _f	6.77	23.6	36.60	6.81
K _{oc}	423.0	944.0	1743.0	400.0
Desorption Phase				
K _f	13.81	31.17	41.18	14.82
K _{oc}	863.0	1247.0	1961.0	872.0
CEC = Cation exchange capacity				

The mobility of AE 0941989 is moderate to low based upon the adsorption data from this study.

MRID 46695407 (Supplemental)

The adsorption/desorption characteristics the tembotrione metabolite AE 0968400 were studied in a sandy loam soil and a silt loam, each from the U.S., and a loamy sand soil, a sandy loam soil, and a silt loam soil, each from Germany, in a batch equilibrium experiment. The physical properties of the soil and accompanying adsorption/desorption data for AE 0968400 are illustrated in **Table A-4**.

Property	Speyer 2.2	Speyer 2.3	Sarotti	Pikeville	Horse Camp Bridge
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Soil texture (USDA)	Loamy Sand	Sandy Loam	Silt Loam	Sandy Loam	Silt Loam
% Sand (50–2000 µm)	86.56	67.38	19.61	75.80	15.26
% Silt (2–50 µm)	8.73	24.22	61.20	19.25	61.18
% Clay (<2 µm)	4.71	8.41	19.20	4.95	23.56
pH					
Deionized water	6.6	6.9	7.4	6.7	7.4
1M KCl	5.9	6.6	7.6	5.7	7.6
0.01M CaCl ₂	6.0	6.4	7.1	5.9	7.2
Organic carbon (%)	1.5	1.1	1.5	1.0	4.0
Organic matter (%)	2.6	1.9	2.6	1.7	6.9
CEC (meq/100 g)	7.7	5.7	12.9	5.6	20.9
Moisture at 1/3 bar (%)	12.6	19.3	31.9	11.4	53.3
Adsorption Phase					
K _f	1.03	1.04	0.27	1.23	1.00
K _{oc}	69.0	94.0	18.0	123.0	25.0
Desorption Phase					
K _f	4.13	5.86	1.03	4.24	4.22
K _{oc}	276.0	533.0	69.0	424.0	105.0
CEC = Cation exchange capacity					

The mobility of AE 0968400 is very high to high based upon the adsorption data from this study.

MRID 46695408 (Supplemental)

The adsorption/desorption characteristics the tembotrione metabolite AE 1124336 were studied in a sandy loam soil and a silt loam, each from the U.S., and a loamy sand soil, a sandy loam soil, and a silt loam soil, each from Germany, in a batch equilibrium experiment. The physical properties of the soil and accompanying adsorption/desorption data for AE 1124336 are illustrated in **Table A-5**.

Property	Speyer 2.2	Speyer 2.3	Sarotti	Pikeville	Horse Camp Bridge
	Loamy Sand	Sandy Loam	Silt Loam	Sandy Loam	Silt Loam
Soil texture (USDA)	Loamy Sand	Sandy Loam	Silt Loam	Sandy Loam	Silt Loam
% Sand (50–2000 µm)	86.56	67.38	19.61	75.80	15.26
% Silt (2–50 µm)	8.73	24.22	61.20	19.25	61.18
% Clay (<2 µm)	4.71	8.41	19.20	4.95	23.56
pH					
Deionized water	6.6	6.9	7.4	6.7	7.4
1M KCl	5.9	6.6	7.6	5.7	7.6
0.01M CaCl ₂	6.0	6.4	7.1	5.9	7.2
Organic carbon (%)	1.5	1.1	1.5	1.0	4.0
Organic matter (%)	2.6	1.9	2.6	1.7	6.9
CEC (meq/100 g)	7.7	5.7	12.9	5.6	20.9

Property	Speyer 2.2	Speyer 2.3	Sarotti	Pikeville	Horse Camp Bridge
Soil texture (USDA)	Loamy Sand	Sandy Loam	Silt Loam	Sandy Loam	Silt Loam
Moisture at 1/3 bar (%)	12.6	19.3	31.9	11.4	53.3
Adsorption Phase					
K_f	3.4	3.5	3.0	3.1	13.3
K_{oc}	227.0	317.0	201.0	310.0	332.0
Desorption Phase					
K_f	6.6	10.2	5.7	5.7	21.5
K_{oc}	443.0	928.0	379.0	568.0	539.0
CEC = Cation exchange capacity					

The mobility of AE 1124336 is moderate based upon the adsorption data from this study.

MRID 46695409 (Supplemental)

The adsorption/desorption characteristics of tembotrione metabolite AE 1392936 were studied in a loamy sand soil and a sandy loam soil, each from Germany, and two clay loam soils from the United Kingdom, in a batch equilibrium experiment. The physical characteristics of the soils and the adsorption/desorption data are provided in **Table A-6**.

Property	Speyer 2.2 03/24 Loamy Sand	Flint Hall 04/13 Clay Loam	Shelley 04/31 Clay Loam	Laacherhof AXXa 04/32 Sandy Loam
Soil texture (USDA)	Loamy Sand	Clay Loam	Clay Loam	Sandy Loam
% Sand	86.56	32.32	28.32	72.51
% Silt	8.73	34.52	41.86	16.85
% Clay	4.71	33.15	29.82	10.63
pH				
Deionized water	6.6/NA	8.3/7.9	7.9/7.5	7.5/7.3
1M KCl	6.0/NA	7.4/7.1	7.0/7.0	7.0/6.8
0.01M CaCl ₂	5.9/NA	7.8/7.5	7.1/7.1	7.3/7.2
Organic carbon (%)	1.6	2.5	2.1	1.7
Organic matter (%)	2.8	4.3	3.6	2.9
CEC (meq/100 g)	7.7	16.6	11.6	7.6
Moisture at 1/3 bar (%)	12.6	28.5	30.9	15.0
Adsorption Phase				
K_f	0.0019	NA	NA	NA
K_{oc}	0.11	NA	NA	NA
Desorption Phase				

Property	Speyer 2.2 03/24 Loamy Sand	Flint Hall 04/13 Clay Loam	Shelley 04/31 Clay Loam	Laacherhof AXXa 04/32 Sandy Loam
K_f	0.52	0.0015	0.08	0.31
K_{oc}	28.7	0.06	4.0	18.1
CEC = Cation exchange capacity NA = Not enough was adsorbed to calculate the coefficient				

Almost no adsorption of the metabolite AE 1392936 was observed in these four soils and leaching potential is considered very high for this metabolite.

164-1 Terrestrial Field Dissipation

MRID 46695425 (Acceptable)

Terrestrial field dissipation studies for tembotrione under U.S. field conditions was studied in bare plots cropped with field corn in New York (Site 1; loamy sand/sand soil), Illinois (Site 2; silt loam soil), Nebraska (Site 3; silt loam/clay loam soil), and California (Site 4; sandy loam soil). Tembotrione formulated as a suspension concentrate was broadcast once at each test site at a target rate of 0.200 kg a.i./ha (0.178 lbs a.i./acre) to four 23.8x36.6 m, 5x41 m, 6x40 m, and 12x17 m subplots at Sites 1, 2, 3, and 4, respectively.

At the New York site tembotrione decreased from an initial concentration of 0.052 mg/kg (time 0) to 0.020 ppm by 1 day, 0.014 ppm by 7 days, and was detected below the LOQ (0.01 ppm) from 14 to 92 days post treatment. Tembotrione was not detected below the 0–15 cm soil depth. Tembotrione had a half-life value of 24.5 days in soil ($r_2 = 0.53$), based on all available replicate data, and 4.8 days in soil ($r_2 = 0.45$) based on 0–7 day data. The only major transformation product detected at Site 1 was AE 0456148, which was not detected at a mean concentration above the LOQ. However, the maximum replicate detection of AE 0456148, 0.0121 ppm (or 14.4% of the applied tembotrione) at 30 days, did exceed the LOQ. The maximum average detection of AE 0456148 was 0.0077 ppm at 30 days, and represented a reviewer-calculated 9.2% of the applied tembotrione, based on the registrant-calculated day 0 theoretical amount. AE 0456148 was detected at levels below the LOQ in the 15–30 cm depth from 14 to 120 days and in the 30–45 and 45–60 cm depths at 120 days only. These data are consistent with the soil adsorption studies on this metabolite which suggests it has high mobility in soil.

In the Illinois test plot (Site 2), the measured zero-time recovery of tembotrione in the 0–15 cm soil layer was 0.062 mg/kg or 62% of the theoretical limit. The concentration of tembotrione decreased to

0.043 ppm by 1 day, 0.023–0.027 ppm by 8–14 days, and was detected below the LOQ from 30 to 120 days post treatment in the 0–15 cm soil depth. Tembotrione was not detected below the 0–15 cm soil depth. Tembotrione had a half-life value of 25.3 days in soil ($r_2 = 0.63$), based on all available replicate data. The only major transformation product detected at Site 2 was AE 0456148, which was detected in the 0–15 cm soil depth at a mean concentration of 0.0121 ppm at 1 day, increased to a maximum of 0.0401 ppm or 39.7% of the applied tembotrione (based on the registrant-calculated day 0 theoretical value for tembotrione) by 14 days, decreased to 0.0179 ppm by 30 days, and was detected below the LOQ at 60 and 91 days post treatment. AE 0456148 was not detected above the LOQ in soil below the 0–15 cm depth. The reviewer-calculated half-life for AE 0456148 was 21.0 days ($r_2 = 0.82$), calculated using linear regression and all replicate data points following the maximum detection at 14 days.

In the Nebraska test plot (Site 3), the measured zero-time recovery of tembotrione in the 0–15 cm soil layer was 0.044 mg/kg or 42% of the theoretical. The concentration of tembotrione decreased to 0.017–0.020 ppm from 1–14 days, was <LOQ at 30 days, and was last detected at 182 days post treatment in the 0–15 cm soil depth. Tembotrione was only detected once each in the 15–30 cm and 30–45 cm soil depths. Tembotrione had a half-life value of 47.5 days in soil ($r_2 = 0.66$), based on all available replicate data, and 7.5 days in soil ($r_2 = 0.29$) based on 0–7 day data. The only major transformation product detected at Site 3 was AE 0456148, which was detected in the 0–15 cm soil depth at a mean concentration of 0.0117 ppm at 1 day, increased to a maximum of 0.0294 ppm or 27.7% of the applied tembotrione (based on the registrant-calculated day 0 theoretical value for tembotrione) by 7 days, decreased to 0.0146 ppm by 120 days, and was detected below the LOQ at 151 and 182 days post treatment. AE 0456148 was not detected above the LOQ in soil below the 0–15 cm depth. The reviewer-calculated half-life for AE 0456148 was 75.3 days ($r_2 = 0.59$), calculated using linear regression and all replicate data points following the maximum detection at 7 days.

In the California test plot (Site 4), the measured zero-time recovery of tembotrione in the 0–15 cm soil layer was 0.052 mg/kg or 66% of the theoretical limit. The concentration of tembotrione decreased to 0.030 ppm by 3 days, 0.022 ppm by 7 days, was detected at a mean concentration below the LOQ at 14 days, and was not detected by 30 days post treatment in the 0–15 cm soil depth. Tembotrione was only detected once in the 15–30 cm soil depth. Tembotrione had a half-life value of 5.9 days in soil ($r_2 = 0.72$), based on all available replicate data. The only major transformation product detected at Site 4 was AE 0456148. AE 0456148 was detected in the 0–15 cm soil depth below the LOQ at 1 day, increased to 0.0121 ppm by 3 days and a maximum of 0.0289 ppm or 36.1% of the applied tembotrione (based on the registrant-calculated day 0 theoretical value for tembotrione) by 14 days, and was detected below the LOQ from 30 to 120 days post treatment. AE 0456148 was detected above the LOQ in two of four replicate samples in the 15–30 cm depth at 30 days post treatment, 0.0106–0.0130 ppm, and was not detected following 30 days. AE 0456148 was also detected in the 30–45 cm depth below the LOQ at the 30-day sampling interval. No half-life for AE 0456148 was calculated because concentrations were below the LOQ at the next sampling interval following the maximum concentration.

PRZM/EXAMS Output

stored as CaliforniaCorn.out

Chemical: Tembotrione

PRZM environment: CAcornC.txt modified Friday, 6 December 2002 at 07:49:36

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w23232.dvf modified Wedday, 3 July 2002 at 05:04:22

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.415	0.4108	0.3942	0.3586	0.333	0.1726
1962	0.7034	0.697	0.6711	0.6221	0.5657	0.3509
1963	0.7614	0.7548	0.7294	0.6725	0.6363	0.4641
1964	0.6161	0.6106	0.5881	0.5406	0.5065	0.3496
1965	0.6029	0.5974	0.5747	0.5281	0.4955	0.3391
1966	0.5855	0.58	0.5577	0.5106	0.4777	0.3319
1967	0.8458	0.8378	0.8053	0.7379	0.6988	0.4405
1968	0.6221	0.6164	0.5934	0.544	0.5087	0.3474
1969	0.5903	0.5847	0.5618	0.5147	0.4819	0.3179
1970	0.5725	0.5669	0.5442	0.4974	0.4647	0.3045
1971	0.571	0.5658	0.5448	0.5003	0.4681	0.3025
1972	0.5598	0.5544	0.5327	0.4872	0.4553	0.293
1973	0.5587	0.5531	0.5306	0.4834	0.4507	0.2923
1974	0.5645	0.5593	0.5381	0.4936	0.4738	0.3148
1975	0.5792	0.5735	0.5505	0.5027	0.4694	0.3046
1976	0.5586	0.553	0.5303	0.483	0.4505	0.2881
1977	0.7912	0.784	0.7546	0.6915	0.6462	0.3864
1978	0.6179	0.612	0.5881	0.5386	0.5041	0.3428
1979	0.5857	0.5801	0.5572	0.5096	0.4761	0.3201
1980	0.5843	0.579	0.5573	0.5122	0.4801	0.3173
1981	0.598	0.5924	0.5696	0.5207	0.486	0.3139
1982	0.5687	0.5633	0.5417	0.4974	0.4667	0.3103
1983	0.8445	0.8364	0.8037	0.7351	0.6901	0.418
1984	0.622	0.6158	0.5908	0.5394	0.5043	0.3441
1985	0.5795	0.5741	0.5525	0.5057	0.4718	0.309
1986	0.5628	0.5574	0.5357	0.4901	0.4581	0.2956
1987	0.5569	0.5513	0.5289	0.4825	0.4511	0.2994
1988	1.156	1.145	1.116	1.033	0.9794	0.5642
1989	0.7015	0.6951	0.669	0.6142	0.5788	0.4662
1990	1.398	1.384	1.326	1.203	1.119	0.6849

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			1.398	1.384	1.326	1.203	1.119	0.6849
0.0645161290322581			1.156	1.145	1.116	1.033	0.9794	0.5642
0.0967741935483871			0.8458	0.8378	0.8053	0.7379	0.6988	0.4662
0.129032258064516			0.8445	0.8364	0.8037	0.7351	0.6901	0.4641
0.161290322580645			0.7912	0.784	0.7546	0.6915	0.6462	0.4405
0.193548387096774			0.7614	0.7548	0.7294	0.6725	0.6363	0.418
0.225806451612903			0.7034	0.697	0.6711	0.6221	0.5788	0.3864

0.258064516129032	0.7015	0.6951	0.669	0.6142	0.5657	0.3509
0.290322580645161	0.6221	0.6164	0.5934	0.544	0.5087	0.3496
0.32258064516129	0.622	0.6158	0.5908	0.5406	0.5065	0.3474
0.354838709677419	0.6179	0.612	0.5881	0.5394	0.5043	0.3441
0.387096774193548	0.6161	0.6106	0.5881	0.5386	0.5041	0.3428
0.419354838709677	0.6029	0.5974	0.5747	0.5281	0.4955	0.3391
0.451612903225806	0.598	0.5924	0.5696	0.5207	0.486	0.3319
0.483870967741936	0.5903	0.5847	0.5618	0.5147	0.4819	0.3201
0.516129032258065	0.5857	0.5801	0.5577	0.5122	0.4801	0.3179
0.548387096774194	0.5855	0.58	0.5573	0.5106	0.4777	0.3173
0.580645161290323	0.5843	0.579	0.5572	0.5096	0.4761	0.3148
0.612903225806452	0.5795	0.5741	0.5525	0.5057	0.4738	0.3139
0.645161290322581	0.5792	0.5735	0.5505	0.5027	0.4718	0.3103
0.67741935483871	0.5725	0.5669	0.5448	0.5003	0.4694	0.309
0.709677419354839	0.571	0.5658	0.5442	0.4974	0.4681	0.3046
0.741935483870968	0.5687	0.5633	0.5417	0.4974	0.4667	0.3045
0.774193548387097	0.5645	0.5593	0.5381	0.4936	0.4647	0.3025
0.806451612903226	0.5628	0.5574	0.5357	0.4901	0.4581	0.2994
0.838709677419355	0.5598	0.5544	0.5327	0.4872	0.4553	0.2956
0.870967741935484	0.5587	0.5531	0.5306	0.4834	0.4511	0.293
0.903225806451613	0.5586	0.553	0.5303	0.483	0.4507	0.2923
0.935483870967742	0.5569	0.5513	0.5289	0.4825	0.4505	0.2881
0.967741935483871	0.415	0.4108	0.3942	0.3586	0.333	0.1726

0.1 0.84567 0.83766 0.80514 0.73762 0.69793 0.46599

Average of yearly averages:

0.352866666666667

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: CaliforniaCorn

Metfile: w23232.dvf

PRZM scenario: CAcornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method: CAM	1	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate: TAPP	0.092	kg/ha		
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	

Application Date Date 17-4 dd/mm or dd/mmm or dd-mm or dd-mmm
 Interval 1 interval 14 days Set to 0 or delete line for single app.
 Record 17: FILTRA
 IPSCND
 UPTKF
 Record 18: PLVKRT
 PLDKRT
 FEXTRC 0.5
 Flag for Index Res. Run IR IR
 Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)
 Write Benthic Porewater File? benthic
 Write Benthic Sediment File? benthicsed
 stored as FLCorn.out
 Chemical: Tembotrione
 PRZM environment: FLsweetcornC.txt modified Friday, 6 December 2002 at 07:54:36
 EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12
 Metfile: w12844.dvf modified Wedday, 3 July 2002 at 05:04:30
 Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.795	1.727	1.631	1.269	0.8924	0.22
1962	0.6932	0.6693	0.5808	0.4325	0.3544	0.1685
1963	2.358	2.272	1.949	1.449	0.9874	0.3045
1964	7.677	7.461	6.438	4.517	3.172	0.9714
1965	7.074	6.813	6.206	5.064	3.485	1.46
1966	3.036	2.961	2.629	1.964	1.61	0.6513
1967	3.563	3.428	3.002	2.378	1.718	0.5089
1968	1.721	1.658	1.431	1.053	0.7279	0.381
1969	5.594	5.43	4.908	4.015	2.83	0.8426
1970	2.351	2.272	1.975	1.478	1.213	0.4393
1971	1.981	1.908	1.713	1.315	0.9179	0.263
1972	25.59	24.63	21.07	14.59	9.748	2.523
1973	9.15	8.831	7.637	5.668	4.636	1.599
1974	2.546	2.452	2.113	1.375	0.9398	0.3201
1975	2.531	2.438	2.092	1.52	1.067	0.4481
1976	2.549	2.456	2.229	1.78	1.211	0.4649
1977	3.59	3.479	2.999	1.976	1.343	0.5308
1978	12.94	12.64	11.16	8.093	5.763	1.709
1979	4.926	4.758	4.127	3.077	2.523	0.9481
1980	1.849	1.8	1.615	1.19	0.8158	0.2902
1981	3.588	3.479	3.063	2.216	1.501	0.51
1982	18.48	18.02	15.67	11.58	7.825	2.252
1983	7.03	6.789	5.886	4.38	3.588	1.568
1984	10.41	10.07	8.739	5.632	3.883	1.208
1985	5.044	4.871	4.221	3.133	2.558	0.8766
1986	2.048	1.971	1.724	1.352	0.9404	0.3688
1987	3.926	3.795	3.614	2.904	1.96	0.6264
1988	2.226	2.143	1.962	1.473	1.018	0.5423
1989	1.783	1.72	1.548	1.193	0.8909	0.361
1990	0.8559	0.8256	0.7155	0.5286	0.4317	0.1855

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			25.59	24.63	21.07	14.59	9.748	2.523
0.0645161290322581			18.48	18.02	15.67	11.58	7.825	2.252
0.0967741935483871			12.94	12.64	11.16	8.093	5.763	1.709
0.129032258064516			10.41	10.07	8.739	5.668	4.636	1.599
0.161290322580645			9.15	8.831	7.637	5.632	3.883	1.568
0.193548387096774			7.677	7.461	6.438	5.064	3.588	1.46
0.225806451612903			7.074	6.813	6.206	4.517	3.485	1.208
0.258064516129032			7.03	6.789	5.886	4.38	3.172	0.9714
0.290322580645161			5.594	5.43	4.908	4.015	2.83	0.9481
0.32258064516129			5.044	4.871	4.221	3.133	2.558	0.8766
0.354838709677419			4.926	4.758	4.127	3.077	2.523	0.8426
0.387096774193548			3.926	3.795	3.614	2.904	1.96	0.6513
0.419354838709677			3.59	3.479	3.063	2.378	1.718	0.6264
0.451612903225806			3.588	3.479	3.002	2.216	1.61	0.5423
0.483870967741936			3.563	3.428	2.999	1.976	1.501	0.5308
0.516129032258065			3.036	2.961	2.629	1.964	1.343	0.51
0.548387096774194			2.549	2.456	2.229	1.78	1.213	0.5089
0.580645161290323			2.546	2.452	2.113	1.52	1.211	0.4649
0.612903225806452			2.531	2.438	2.092	1.478	1.067	0.4481
0.645161290322581			2.358	2.272	1.975	1.473	1.018	0.4393
0.67741935483871			2.351	2.272	1.962	1.449	0.9874	0.381
0.709677419354839			2.226	2.143	1.949	1.375	0.9404	0.3688
0.741935483870968			2.048	1.971	1.724	1.352	0.9398	0.361
0.774193548387097			1.981	1.908	1.713	1.315	0.9179	0.3201
0.806451612903226			1.849	1.8	1.631	1.269	0.8924	0.3045
0.838709677419355			1.795	1.727	1.615	1.193	0.8909	0.2902
0.870967741935484			1.783	1.72	1.548	1.19	0.8158	0.263
0.903225806451613			1.721	1.658	1.431	1.053	0.7279	0.22
0.935483870967742			0.8559	0.8256	0.7155	0.5286	0.4317	0.1855
0.967741935483871			0.6932	0.6693	0.5808	0.4325	0.3544	0.1685

0.1 12.687 12.383 10.9179 7.8505 5.6503 1.698

Average of yearly averages:

0.784743333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: FLCorn

Metfile: w12844.dvf

PRZM scenario: FLsweetcornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	

Photolysis half-life kdp 172 days Half-life
 Aerobic Aquatic Metabolism kbacw 278 days Halfife
 Anaerobic Aquatic Metabolism kbacs 1198 days Halfife
 Aerobic Soil Metabolism asm 46 days Halfife
 Hydrolysis: pH 7 0 days Half-life
 Method: CAM 1 integer See PRZM manual
 Incorporation Depth: DEPI cm
 Application Rate: TAPP 0.092 kg/ha
 Application Efficiency: APPEFF0.99 fraction
 Spray Drift DRFT 0.064 fraction of application rate applied to pond
 Application Date Date 24-10 dd/mm or dd/mmm or dd-mm or dd-mmm
 Interval 1 interval 14 days Set to 0 or delete line for single app.

Record 17: FILTRA

IPSCND

UPTKF

Record 18: PLVKRT

PLDKRT

FEXTRC 0.5

Flag for Index Res. Run IR IR

Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

Write Benthic Porewater File? benthic

Write Benthic Sediment File? benthicsed

stored as IllinoisCorn.out

Chemical: Tembotrione

PRZM environment: ILCornC.txt modified Friday, 6 December 2002 at 09:08:12

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w14923.dvf modified Wedday, 3 July 2002 at 05:04:40

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.507	1.478	1.364	1.284	1.16	0.5098
1962	2.57	2.525	2.36	2.048	1.864	0.8766
1963	1.395	1.369	1.273	1.098	1.074	0.6519
1964	1.989	1.954	1.864	1.632	1.457	0.6977
1965	1.72	1.689	1.59	1.423	1.293	0.6511
1966	5.165	5.071	4.764	4.408	4.122	1.865
1967	8.053	7.931	7.418	6.295	5.592	2.502
1968	1.602	1.582	1.501	1.336	1.226	0.8717
1969	2.185	2.144	2.013	1.775	1.585	0.742
1970	5.202	5.113	4.971	4.578	4.139	1.818
1971	3.049	2.999	2.795	2.555	2.441	1.318
1972	3.839	3.768	3.531	3.001	2.69	1.316
1973	4.186	4.114	3.967	3.6	3.224	1.507
1974	4.617	4.561	4.391	3.955	3.613	1.731
1975	1.506	1.479	1.397	1.305	1.205	0.7564
1976	1.398	1.376	1.306	1.23	1.15	0.5879
1977	2.527	2.479	2.359	2.021	1.857	0.945
1978	2.415	2.373	2.309	2.065	1.879	0.9349
1979	1.363	1.338	1.239	1.108	1.004	0.5652
1980	3.626	3.564	3.368	2.917	2.595	1.153
1981	1.257	1.234	1.171	1.048	0.9726	0.6095

1982	3.87	3.8	3.582	3.212	2.886	1.255
1983	3.113	3.074	2.895	2.424	2.141	1.081
1984	4.854	4.764	4.599	4.106	3.684	1.667
1985	2.094	2.058	1.98	1.773	1.625	0.9351
1986	3.541	3.496	3.356	3	2.746	1.251
1987	2.921	2.869	2.717	2.361	2.133	1.085
1988	1.171	1.151	1.068	0.9181	0.8271	0.5171
1989	1.673	1.641	1.518	1.35	1.228	0.581
1990	3.206	3.154	2.984	2.805	2.539	1.132

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			8.053	7.931	7.418	6.295	5.592	2.502
0.0645161290322581			5.202	5.113	4.971	4.578	4.139	1.865
0.0967741935483871			5.165	5.071	4.764	4.408	4.122	1.818
0.129032258064516			4.854	4.764	4.599	4.106	3.684	1.731
0.161290322580645			4.617	4.561	4.391	3.955	3.613	1.667
0.193548387096774			4.186	4.114	3.967	3.6	3.224	1.507
0.225806451612903			3.87	3.8	3.582	3.212	2.886	1.318
0.258064516129032			3.839	3.768	3.531	3.001	2.746	1.316
0.290322580645161			3.626	3.564	3.368	3	2.69	1.255
0.32258064516129			3.541	3.496	3.356	2.917	2.595	1.251
0.354838709677419			3.206	3.154	2.984	2.805	2.539	1.153
0.387096774193548			3.113	3.074	2.895	2.555	2.441	1.132
0.419354838709677			3.049	2.999	2.795	2.424	2.141	1.085
0.451612903225806			2.921	2.869	2.717	2.361	2.133	1.081
0.483870967741936			2.57	2.525	2.36	2.065	1.879	0.945
0.516129032258065			2.527	2.479	2.359	2.048	1.864	0.9351
0.548387096774194			2.415	2.373	2.309	2.021	1.857	0.9349
0.580645161290323			2.185	2.144	2.013	1.775	1.625	0.8766
0.612903225806452			2.094	2.058	1.98	1.773	1.585	0.8717
0.645161290322581			1.989	1.954	1.864	1.632	1.457	0.7564
0.67741935483871			1.72	1.689	1.59	1.423	1.293	0.742
0.709677419354839			1.673	1.641	1.518	1.35	1.228	0.6977
0.741935483870968			1.602	1.582	1.501	1.336	1.226	0.6519
0.774193548387097			1.507	1.479	1.397	1.305	1.205	0.6511
0.806451612903226			1.506	1.478	1.364	1.284	1.16	0.6095
0.838709677419355			1.398	1.376	1.306	1.23	1.15	0.5879
0.870967741935484			1.395	1.369	1.273	1.108	1.074	0.581
0.903225806451613			1.363	1.338	1.239	1.098	1.004	0.5652
0.935483870967742			1.257	1.234	1.171	1.048	0.9726	0.5171
0.967741935483871			1.171	1.151	1.068	0.9181	0.8271	0.5098

0.1 5.1339 5.0403 4.7475 4.3778 4.0782 1.8093

Average of yearly averages: **1.07046333333333**

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: IllinoisCorn

Metfile: w14923.dvf

PRZM scenario: ILCornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM 1	integer		See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.092	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	10-5	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.

Record 17: FILTRA

IPSCND

UPTKF

Record 18: PLVKRT

PLDKRT

FEXTRC 0.5

Flag for Index Res. Run IR IR

Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

Write Benthic Porewater File? benthic

Write Benthic Sediment File? benthicsed

stored as MSCorn.out

Chemical: Tembotrione

PRZM environment: MScornC.txt modified Friday, 6 December 2002 at 09:11:04

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w13893.dvf modified Wedday, 3 July 2002 at 05:06:20

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.5845	0.5709	0.5179	0.425	0.3676	0.1578
1962	0.6046	0.5897	0.5321	0.4345	0.3768	0.1898
1963	1.944	1.898	1.771	1.457	1.255	0.557
1964	4.242	4.145	3.924	3.247	2.795	1.082
1965	1.649	1.609	1.455	1.175	1.007	0.5185
1966	2.601	2.54	2.366	1.943	1.688	0.7037
1967	2.232	2.18	1.977	1.6	1.4	0.6049
1968	0.6066	0.5928	0.5387	0.4607	0.4071	0.2702
1969	0.459	0.4483	0.4065	0.3333	0.2969	0.1499
1970	2.628	2.565	2.458	2.04	1.759	0.699
1971	0.8609	0.8414	0.7655	0.6638	0.5791	0.2816

1972	1.261	1.231	1.125	0.9224	0.8144	0.3404
1973	4.573	4.47	4.244	3.549	3.059	1.193
1974	3.655	3.572	3.331	3.068	2.912	1.258
1975	1.714	1.674	1.52	1.25	1.095	0.5273
1976	1.598	1.56	1.411	1.151	1.004	0.435
1977	1.468	1.433	1.36	1.149	0.9918	0.5324
1978	8.495	8.356	7.59	6.106	5.219	1.937
1979	3.351	3.273	2.97	2.519	2.206	0.9631
1980	0.7297	0.7121	0.6822	0.5794	0.5091	0.2987
1981	0.8795	0.8592	0.7801	0.6844	0.6007	0.2963
1982	0.443	0.4324	0.3914	0.3187	0.284	0.1841
1983	4.444	4.34	3.99	3.293	2.831	1.075
1984	6.105	5.961	5.401	4.365	3.782	1.484
1985	4.354	4.254	3.955	3.252	2.798	1.163
1986	0.5372	0.5252	0.4782	0.4021	0.3575	0.2568
1987	0.453	0.4447	0.4117	0.3476	0.3157	0.2075
1988	0.4546	0.444	0.4025	0.3292	0.2929	0.1926
1989	0.4382	0.4281	0.3885	0.3163	0.2863	0.1596
1990	1.528	1.492	1.388	1.163	1.018	0.4935

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			8.495	8.356	7.59	6.106	5.219	1.937
0.0645161290322581			6.105	5.961	5.401	4.365	3.782	1.484
0.0967741935483871			4.573	4.47	4.244	3.549	3.059	1.258
0.129032258064516			4.444	4.34	3.99	3.293	2.912	1.193
0.161290322580645			4.354	4.254	3.955	3.252	2.831	1.163
0.193548387096774			4.242	4.145	3.924	3.247	2.798	1.082
0.225806451612903			3.655	3.572	3.331	3.068	2.795	1.075
0.258064516129032			3.351	3.273	2.97	2.519	2.206	0.9631
0.290322580645161			2.628	2.565	2.458	2.04	1.759	0.7037
0.32258064516129			2.601	2.54	2.366	1.943	1.688	0.699
0.354838709677419			2.232	2.18	1.977	1.6	1.4	0.6049
0.387096774193548			1.944	1.898	1.771	1.457	1.255	0.557
0.419354838709677			1.714	1.674	1.52	1.25	1.095	0.5324
0.451612903225806			1.649	1.609	1.455	1.175	1.018	0.5273
0.483870967741936			1.598	1.56	1.411	1.163	1.007	0.5185
0.516129032258065			1.528	1.492	1.388	1.151	1.004	0.4935
0.548387096774194			1.468	1.433	1.36	1.149	0.9918	0.435
0.580645161290323			1.261	1.231	1.125	0.9224	0.8144	0.3404
0.612903225806452			0.8795	0.8592	0.7801	0.6844	0.6007	0.2987
0.645161290322581			0.8609	0.8414	0.7655	0.6638	0.5791	0.2963
0.67741935483871			0.7297	0.7121	0.6822	0.5794	0.5091	0.2816
0.709677419354839			0.6066	0.5928	0.5387	0.4607	0.4071	0.2702
0.741935483870968			0.6046	0.5897	0.5321	0.4345	0.3768	0.2568
0.774193548387097			0.5845	0.5709	0.5179	0.425	0.3676	0.2075
0.806451612903226			0.5372	0.5252	0.4782	0.4021	0.3575	0.1926
0.838709677419355			0.459	0.4483	0.4117	0.3476	0.3157	0.1898
0.870967741935484			0.4546	0.4447	0.4065	0.3333	0.2969	0.1841
0.903225806451613			0.453	0.444	0.4025	0.3292	0.2929	0.1596
0.935483870967742			0.443	0.4324	0.3914	0.3187	0.2863	0.1578

0.967741935483871 0.4382 0.4281 0.3885 0.3163 0.284 0.1499

0.1 4.5601 4.457 4.2186 3.5234 3.0443 1.2515

Average of yearly averages: 0.607056666666667

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: MSCorn

Metfile: w13893.dvf

PRZM scenario: MSCornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM 1	integer		See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.092	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	20-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.

Record 17: FILTRA

IPSCND

UPTKF

Record 18: PLVKRT

PLDKRT

FEXTRC 0.5

Flag for Index Res. Run IR IR

Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

Write Benthic Porewater File? benthic

Write Benthic Sediment File? benthicsed

stored as NCCornEast.out

Chemical: Tembotrione

PRZM environment: NCCornEC.txt modified Friday, 6 December 2002 at 09:13:40

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w13722.dvf modified Wedday, 3 July 2002 at 05:05:50

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.658	1.63	1.529	1.313	1.172	0.4941

1962	0.7805	0.7673	0.7285	0.6653	0.6192	0.3595
1963	1.959	1.927	1.848	1.604	1.434	0.6593
1964	0.6104	0.6001	0.5593	0.54	0.5245	0.3426
1965	0.954	0.9382	0.8908	0.7983	0.7262	0.3747
1966	1.376	1.353	1.262	1.122	1.036	0.5087
1967	1.249	1.229	1.171	1.04	0.9584	0.486
1968	0.6245	0.6148	0.5751	0.531	0.49	0.2779
1969	1.22	1.2	1.145	1.023	0.9208	0.4365
1970	1.638	1.611	1.524	1.327	1.192	0.5691
1971	1.816	1.789	1.705	1.486	1.335	0.6482
1972	1.847	1.817	1.725	1.498	1.369	0.6815
1973	2.061	2.028	1.932	1.793	1.632	0.7847
1974	2.026	1.992	1.873	1.635	1.48	0.7305
1975	0.8211	0.8117	0.7609	0.6862	0.6374	0.3787
1976	1.56	1.535	1.468	1.27	1.134	0.5306
1977	0.8033	0.7907	0.7387	0.6536	0.6048	0.3417
1978	5.433	5.367	5.098	4.513	4.072	1.753
1979	1.266	1.247	1.201	1.077	0.9851	0.6539
1980	1.641	1.613	1.513	1.332	1.204	0.5839
1981	1.126	1.107	1.039	0.8884	0.8068	0.4369
1982	0.74	0.7277	0.6951	0.6559	0.6056	0.3194
1983	1.012	0.9991	0.9434	0.8143	0.7346	0.3605
1984	1.901	1.871	1.74	1.644	1.545	0.7356
1985	1.683	1.656	1.581	1.464	1.336	0.6697
1986	2.282	2.243	2.089	1.785	1.589	0.7563
1987	0.8181	0.8049	0.7516	0.7099	0.6842	0.4207
1988	0.8916	0.8769	0.8184	0.704	0.6344	0.3287
1989	1.633	1.606	1.509	1.324	1.192	0.5533
1990	1.9	1.868	1.761	1.558	1.408	0.6694

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			5.433	5.367	5.098	4.513	4.072	1.753
0.0645161290322581			2.282	2.243	2.089	1.793	1.632	0.7847
0.0967741935483871			2.061	2.028	1.932	1.785	1.589	0.7563
0.129032258064516			2.026	1.992	1.873	1.644	1.545	0.7356
0.161290322580645			1.959	1.927	1.848	1.635	1.48	0.7305
0.193548387096774			1.901	1.871	1.761	1.604	1.434	0.6815
0.225806451612903			1.9	1.868	1.74	1.558	1.408	0.6697
0.258064516129032			1.847	1.817	1.725	1.498	1.369	0.6694
0.290322580645161			1.816	1.789	1.705	1.486	1.336	0.6593
0.32258064516129			1.683	1.656	1.581	1.464	1.335	0.6539
0.354838709677419			1.658	1.63	1.529	1.332	1.204	0.6482
0.387096774193548			1.641	1.613	1.524	1.327	1.192	0.5839
0.419354838709677			1.638	1.611	1.513	1.324	1.192	0.5691
0.451612903225806			1.633	1.606	1.509	1.313	1.172	0.5533
0.483870967741936			1.56	1.535	1.468	1.27	1.134	0.5306
0.516129032258065			1.376	1.353	1.262	1.122	1.036	0.5087
0.548387096774194			1.266	1.247	1.201	1.077	0.9851	0.4941
0.580645161290323			1.249	1.229	1.171	1.04	0.9584	0.486
0.612903225806452			1.22	1.2	1.145	1.023	0.9208	0.4369

0.645161290322581	1.126	1.107	1.039	0.8884	0.8068	0.4365
0.67741935483871	1.012	0.9991	0.9434	0.8143	0.7346	0.4207
0.709677419354839	0.954	0.9382	0.8908	0.7983	0.7262	0.3787
0.741935483870968	0.8916	0.8769	0.8184	0.7099	0.6842	0.3747
0.774193548387097	0.8211	0.8117	0.7609	0.704	0.6374	0.3605
0.806451612903226	0.8181	0.8049	0.7516	0.6862	0.6344	0.3595
0.838709677419355	0.8033	0.7907	0.7387	0.6653	0.6192	0.3426
0.870967741935484	0.7805	0.7673	0.7285	0.6559	0.6056	0.3417
0.903225806451613	0.74	0.7277	0.6951	0.6536	0.6048	0.3287
0.935483870967742	0.6245	0.6148	0.5751	0.54	0.5245	0.3194
0.967741935483871	0.6104	0.6001	0.5593	0.531	0.49	0.2779

0.1 2.0575 2.0244 1.9261 1.7709 1.5846 0.75423
Average of yearly averages: **0.56152**

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: NCCornEast

Metfile: w13722.dvf

PRZM scenario: NCCornEC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM 1	integer		See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.092	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	20-4	dd/mm or dd/mm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	IR		
Flag for runoff calc.	RUNOFF	total	none, monthly or total(average of entire run)	
Write Benthic Porewater File?		benthic		

Write Benthic Sediment File? benthicsed

stored as NCCornWest.out

Chemical: Tembotrione

PRZM environment: NCcornWC.txt modified Friday, 6 December 2002 at 09:14:12

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w03812.dvf modified Wedday, 3 July 2002 at 05:05:50

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1965	3.313	3.244	2.973	2.607	2.3	0.8875
1966	3.281	3.214	3.077	2.686	2.378	1.059
1967	2.941	2.884	2.727	2.364	2.098	0.9705
1968	1.851	1.811	1.658	1.414	1.26	0.6192
1969	1.712	1.676	1.556	1.398	1.25	0.5703
1970	0.7198	0.7046	0.6486	0.5797	0.5527	0.3104
1971	1.505	1.473	1.393	1.304	1.203	0.5275
1972	1.401	1.372	1.257	1.154	1.069	0.5012
1973	8.139	7.994	7.353	6.097	5.315	2.104
1974	3.683	3.608	3.475	3.206	2.886	1.375
1975	3.982	3.915	3.61	3.004	2.716	1.216
1976	6.12	6.004	5.535	4.65	4.073	1.718
1977	1.085	1.063	1.024	0.9352	0.8452	0.5453
1978	1.488	1.466	1.383	1.298	1.177	0.5442
1979	1.244	1.218	1.167	1.038	0.9497	0.4475
1980	3.54	3.492	3.264	2.851	2.541	1.025
1981	3.822	3.757	3.516	2.962	2.59	1.132
1982	1.538	1.523	1.456	1.267	1.118	0.5693
1983	2.032	1.989	1.876	1.651	1.458	0.6186
1984	4.135	4.051	3.706	3.255	3.026	1.296
1985	0.7689	0.7531	0.6911	0.6262	0.6053	0.4276
1986	1.773	1.736	1.61	1.343	1.177	0.5062
1987	6.723	6.593	6.132	5.178	4.522	1.756
1988	0.9455	0.9315	0.875	0.7628	0.6894	0.4761
1989	3.825	3.76	3.596	3.466	3.155	1.296
1990	2.13	2.086	1.917	1.683	1.543	0.7902

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.037037037037037			8.139	7.994	7.353	6.097 5.315 2.104
0.0740740740740741			6.723	6.593	6.132	5.178 4.522 1.756
0.1111111111111111			6.12	6.004	5.535	4.65 4.073 1.718
0.148148148148148			4.135	4.051	3.706	3.466 3.155 1.375
0.185185185185185			3.982	3.915	3.61	3.255 3.026 1.296
0.222222222222222			3.825	3.76	3.596	3.206 2.886 1.296
0.259259259259259			3.822	3.757	3.516	3.004 2.716 1.216
0.296296296296296			3.683	3.608	3.475	2.962 2.59 1.132
0.333333333333333			3.54	3.492	3.264	2.851 2.541 1.059
0.37037037037037			3.313	3.244	3.077	2.686 2.378 1.025
0.407407407407407			3.281	3.214	2.973	2.607 2.3 0.9705
0.444444444444444			2.941	2.884	2.727	2.364 2.098 0.8875

0.481481481481481	2.13	2.086	1.917	1.683	1.543	0.7902
0.518518518518518	2.032	1.989	1.876	1.651	1.458	0.6192
0.555555555555556	1.851	1.811	1.658	1.414	1.26	0.6186
0.592592592592593	1.773	1.736	1.61	1.398	1.25	0.5703
0.62962962962963	1.712	1.676	1.556	1.343	1.203	0.5693
0.666666666666667	1.538	1.523	1.456	1.304	1.177	0.5453
0.703703703703704	1.505	1.473	1.393	1.298	1.177	0.5442
0.740740740740741	1.488	1.466	1.383	1.267	1.118	0.5275
0.777777777777778	1.401	1.372	1.257	1.154	1.069	0.5062
0.814814814814815	1.244	1.218	1.167	1.038	0.9497	0.5012
0.851851851851852	1.085	1.063	1.024	0.9352	0.8452	0.4761
0.888888888888889	0.9455	0.9315	0.875	0.7628	0.6894	0.4475
0.925925925925926	0.7689	0.7531	0.6911	0.6262	0.6053	0.4276
0.962962962962963	0.7198	0.7046	0.6486	0.5797	0.5527	0.3104

0.1 6.3009 6.1807 5.7141 4.8084 4.2077 1.7294
Average of yearly averages: **0.895715384615384**

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: NCCornWest

Metfile: w03812.dvf

PRZM scenario: NCcornWC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method: CAM	1	integer		See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate: TAPP	0.092	kg/ha		
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	5-5	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		

Flag for Index Res. Run IR IR
 Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)
 Write Benthic Porewater File? benthic
 Write Benthic Sediment File? benthicsed
 stored as NDCorn.out
 Chemical: Tembotrione
 PRZM environment: NDcornC.txt modified Friday, 6 December 2002 at 09:16:04
 EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12
 Metfile: w14914.dvf modified Wedday, 3 July 2002 at 05:05:52
 Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.7963	0.7907	0.7697	0.7266	0.712	0.3665
1962	3.007	2.981	2.886	2.723	2.622	1.536
1963	2.42	2.399	2.336	2.153	2.097	1.634
1964	4.468	4.424	4.243	3.854	3.666	2.22
1965	2.473	2.453	2.378	2.271	2.199	1.888
1966	1.499	1.487	1.442	1.39	1.394	1.206
1967	1.416	1.404	1.366	1.263	1.194	0.9136
1968	1.295	1.284	1.25	1.222	1.171	0.8272
1969	2.635	2.61	2.504	2.339	2.211	1.371
1970	2.689	2.673	2.589	2.389	2.281	1.663
1971	2.224	2.204	2.14	2.109	2.039	1.526
1972	1.361	1.349	1.315	1.285	1.24	1.106
1973	1.108	1.098	1.085	1.057	1.037	0.8772
1974	2.165	2.146	2.068	1.998	1.915	1.212
1975	5.443	5.406	5.188	4.729	4.47	2.564
1976	2.747	2.732	2.672	2.542	2.449	1.845
1977	3.406	3.371	3.234	2.967	2.803	1.791
1978	3.865	3.832	3.686	3.434	3.257	2.187
1979	2.566	2.542	2.459	2.382	2.294	1.848
1980	1.577	1.564	1.51	1.422	1.383	1.29
1981	2.68	2.658	2.589	2.49	2.419	1.576
1982	1.556	1.547	1.504	1.418	1.392	1.215
1983	1.883	1.864	1.795	1.703	1.634	1.135
1984	4.696	4.65	4.464	4.07	3.805	2.173
1985	4.352	4.315	4.213	3.994	3.87	2.724
1986	3.407	3.376	3.274	3.141	3	2.3
1987	2.45	2.429	2.34	2.199	2.206	1.821
1988	1.462	1.454	1.423	1.356	1.318	1.25
1989	1.515	1.503	1.45	1.415	1.385	1.139
1990	3.381	3.349	3.231	3.019	2.879	1.745

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129			5.443	5.406	5.188	4.729 4.47 2.724
0.0645161290322581			4.696	4.65	4.464	4.07 3.87 2.564
0.0967741935483871			4.468	4.424	4.243	3.994 3.805 2.3
0.129032258064516			4.352	4.315	4.213	3.854 3.666 2.22
0.161290322580645			3.865	3.832	3.686	3.434 3.257 2.187
0.193548387096774			3.407	3.376	3.274	3.141 3 2.173

0.225806451612903	3.406	3.371	3.234	3.019	2.879	1.888
0.258064516129032	3.381	3.349	3.231	2.967	2.803	1.848
0.290322580645161	3.007	2.981	2.886	2.723	2.622	1.845
0.32258064516129	2.747	2.732	2.672	2.542	2.449	1.821
0.354838709677419	2.689	2.673	2.589	2.49	2.419	1.791
0.387096774193548	2.68	2.658	2.589	2.389	2.294	1.745
0.419354838709677	2.635	2.61	2.504	2.382	2.281	1.663
0.451612903225806	2.566	2.542	2.459	2.339	2.211	1.634
0.483870967741936	2.473	2.453	2.378	2.271	2.206	1.576
0.516129032258065	2.45	2.429	2.34	2.199	2.199	1.536
0.548387096774194	2.42	2.399	2.336	2.153	2.097	1.526
0.580645161290323	2.224	2.204	2.14	2.109	2.039	1.371
0.612903225806452	2.165	2.146	2.068	1.998	1.915	1.29
0.645161290322581	1.883	1.864	1.795	1.703	1.634	1.25
0.67741935483871	1.577	1.564	1.51	1.422	1.394	1.215
0.709677419354839	1.556	1.547	1.504	1.418	1.392	1.212
0.741935483870968	1.515	1.503	1.45	1.415	1.385	1.206
0.774193548387097	1.499	1.487	1.442	1.39	1.383	1.139
0.806451612903226	1.462	1.454	1.423	1.356	1.318	1.135
0.838709677419355	1.416	1.404	1.366	1.285	1.24	1.106
0.870967741935484	1.361	1.349	1.315	1.263	1.194	0.9136
0.903225806451613	1.295	1.284	1.25	1.222	1.171	0.8772
0.935483870967742	1.108	1.098	1.085	1.057	1.037	0.8272
0.967741935483871	0.7963	0.7907	0.7697	0.7266	0.712	0.3665

0.1 4.4564 4.4131 4.24 3.98 3.7911 2.292

Average of yearly averages:

1.56498333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: NDCorn

Metfile: w14914.dvf

PRZM scenario: NDcornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.092	kg/ha	

Application Efficiency: APPEFF0.99 fraction
 Spray Drift DRFT 0.064 fraction of application rate applied to pond
 Application Date Date 15-5 dd/mm or dd/mmm or dd-mm or dd-mmm
 Interval 1 interval 14 days Set to 0 or delete line for single app.
 Record 17: FILTRA
 IPSCND
 UPTKF
 Record 18: PLVKRT
 PLDKRT
 FEXTRC 0.5
 Flag for Index Res. Run IR IR
 Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)
 Write Benthic Porewater File? benthic
 Write Benthic Sediment File? benthicsed

stored as OhioCorn.out

Chemical: Tembotrione

PRZM environment: OHCornC.txt modified Friday, 6 December 2002 at 09:17:14

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w93815.dvf modified Wedday, 3 July 2002 at 05:06:06

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.815	2.771	2.597	2.265	2.048	0.8587
1962	2.957	2.912	2.73	2.395	2.177	1.145
1963	2.617	2.587	2.481	2.243	2.049	1.104
1964	0.921	0.9077	0.8541	0.7924	0.7424	0.5393
1965	2.258	2.224	2.085	1.814	1.641	0.7783
1966	0.798	0.7875	0.7435	0.6668	0.6234	0.4327
1967	2.712	2.675	2.509	2.272	2.125	1.028
1968	4.41	4.35	4.103	3.75	3.453	1.76
1969	2.379	2.347	2.252	2.109	1.953	1.197
1970	1.27	1.251	1.195	1.071	0.9844	0.6282
1971	1.294	1.274	1.197	1.051	1.02	0.5873
1972	2.17	2.146	2.025	1.851	1.703	0.8892
1973	1.3	1.286	1.217	1.071	0.974	0.6112
1974	3.009	2.965	2.83	2.476	2.396	1.228
1975	1.118	1.102	1.053	0.9533	0.8911	0.6629
1976	1.538	1.515	1.426	1.28	1.166	0.609
1977	0.759	0.7474	0.6993	0.627	0.5982	0.4121
1978	1.704	1.678	1.58	1.42	1.305	0.6718
1979	1.339	1.319	1.238	1.107	1.02	0.593
1980	3.825	3.767	3.536	3.076	2.774	1.337
1981	3.324	3.272	3.098	2.701	2.441	1.358
1982	3.521	3.471	3.271	2.888	2.621	1.385
1983	1.635	1.61	1.558	1.395	1.267	0.836
1984	2.098	2.069	1.968	1.759	1.606	0.8404
1985	0.9608	0.9472	0.8926	0.7983	0.7461	0.4938
1986	1.409	1.387	1.33	1.164	1.053	0.5437
1987	1.284	1.269	1.193	1.075	0.9808	0.5461
1988	0.8682	0.8559	0.805	0.7102	0.7001	0.4329

1989	7.679	7.569	7.186	6.27	5.658	2.492
1990	3.223	3.181	3.026	2.789	2.571	1.649

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			7.679	7.569	7.186	6.27	5.658	2.492
0.0645161290322581			4.41	4.35	4.103	3.75	3.453	1.76
0.0967741935483871			3.825	3.767	3.536	3.076	2.774	1.649
0.129032258064516			3.521	3.471	3.271	2.888	2.621	1.385
0.161290322580645			3.324	3.272	3.098	2.789	2.571	1.358
0.193548387096774			3.223	3.181	3.026	2.701	2.441	1.337
0.225806451612903			3.009	2.965	2.83	2.476	2.396	1.228
0.258064516129032			2.957	2.912	2.73	2.395	2.177	1.197
0.290322580645161			2.815	2.771	2.597	2.272	2.125	1.145
0.32258064516129			2.712	2.675	2.509	2.265	2.049	1.104
0.354838709677419			2.617	2.587	2.481	2.243	2.048	1.028
0.387096774193548			2.379	2.347	2.252	2.109	1.953	0.8892
0.419354838709677			2.258	2.224	2.085	1.851	1.703	0.8587
0.451612903225806			2.17	2.146	2.025	1.814	1.641	0.8404
0.483870967741936			2.098	2.069	1.968	1.759	1.606	0.836
0.516129032258065			1.704	1.678	1.58	1.42	1.305	0.7783
0.548387096774194			1.635	1.61	1.558	1.395	1.267	0.6718
0.580645161290323			1.538	1.515	1.426	1.28	1.166	0.6629
0.612903225806452			1.409	1.387	1.33	1.164	1.053	0.6282
0.645161290322581			1.339	1.319	1.238	1.107	1.02	0.6112
0.67741935483871			1.3	1.286	1.217	1.075	1.02	0.609
0.709677419354839			1.294	1.274	1.197	1.071	0.9844	0.593
0.741935483870968			1.284	1.269	1.195	1.071	0.9808	0.5873
0.774193548387097			1.27	1.251	1.193	1.051	0.974	0.5461
0.806451612903226			1.118	1.102	1.053	0.9533	0.8911	0.5437
0.838709677419355			0.9608	0.9472	0.8926	0.7983	0.7461	0.5393
0.870967741935484			0.921	0.9077	0.8541	0.7924	0.7424	0.4938
0.903225806451613			0.8682	0.8559	0.805	0.7102	0.7001	0.4329
0.935483870967742			0.798	0.7875	0.7435	0.6668	0.6234	0.4327
0.967741935483871			0.759	0.7474	0.6993	0.627	0.5982	0.4121

0.1 3.7946 3.7374 3.5095 3.0572 2.7587 1.6226

Average of yearly averages: 0.921653333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: OhioCorn

Metfile: w93815.dvf

PRZM scenario: OHCornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	

Solubility sol 283000 mg/L
 Kd Kd mg/L
 Koc Koc 110 mg/L
 Photolysis half-life kdp 172 days Half-life
 Aerobic Aquatic Metabolism kbacw 278 days Halfife
 Anaerobic Aquatic Metabolism kbacs 1198 days Halfife
 Aerobic Soil Metabolism asm 46 days Halfife
 Hydrolysis: pH 7 0 days Half-life
 Method: CAM 1 integer See PRZM manual
 Incorporation Depth: DEPI cm
 Application Rate: TAPP 0.092 kg/ha
 Application Efficiency: APPEFF0.99 fraction
 Spray Drift DRFT 0.064 fraction of application rate applied to pond
 Application Date Date 10-5 dd/mm or dd/mmm or dd-mm or dd-mmm
 Interval 1 interval 14 days Set to 0 or delete line for single app.
 Record 17: FILTRA

IPSCND

UPTKF

Record 18: PLVKRT

PLDKRT

FEXTRC 0.5

Flag for Index Res. Run IR IR

Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

Write Benthic Porewater File? benthic

Write Benthic Sediment File? benthicsed

stored as ORCorn.out

Chemical: Tembotrione

PRZM environment: ORswcornC.txt modified Friday, 6 December 2002 at 09:20:42

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w24232.dvf modified Wedday, 3 July 2002 at 05:06:10

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.4707	0.4613	0.4243	0.3735	0.3528	0.1589
1962	0.4439	0.4353	0.4017	0.3376	0.3045	0.1944
1963	0.4601	0.4514	0.4168	0.3511	0.3181	0.1949
1964	0.4893	0.4801	0.4467	0.3773	0.3364	0.1724
1965	0.7031	0.6895	0.6359	0.5317	0.4811	0.2315
1966	0.4557	0.4469	0.4123	0.3464	0.3134	0.1788
1967	0.4378	0.4291	0.3952	0.3307	0.2976	0.1684
1968	0.8233	0.8074	0.7446	0.6509	0.587	0.3111
1969	1.339	1.313	1.208	1.02	0.9104	0.448
1970	0.51	0.5003	0.4619	0.3898	0.3557	0.2727
1971	0.6684	0.6564	0.6053	0.5121	0.4793	0.2831
1972	0.4641	0.4553	0.4204	0.3533	0.3201	0.2139
1973	0.4837	0.4745	0.4406	0.4015	0.3602	0.1984
1974	0.4394	0.4308	0.3972	0.3333	0.3003	0.154
1975	0.435	0.4266	0.3936	0.3303	0.2972	0.1469
1976	0.429	0.4208	0.3885	0.334	0.3002	0.143
1977	0.4778	0.4685	0.4334	0.3644	0.3258	0.1676
1978	0.4381	0.4294	0.3953	0.3636	0.3466	0.1819

1979	0.4865	0.4772	0.4406	0.4023	0.3883	0.2293
1980	0.6828	0.6699	0.6191	0.542	0.4871	0.2599
1981	1.507	1.478	1.385	1.168	1.029	0.4421
1982	0.4944	0.4848	0.4473	0.3817	0.3485	0.2159
1983	0.6262	0.6141	0.5664	0.5071	0.4645	0.2188
1984	0.9259	0.9125	0.8426	0.7615	0.6809	0.3061
1985	2.854	2.797	2.591	2.165	1.904	0.7821
1986	0.6529	0.6407	0.5925	0.5288	0.4985	0.3522
1987	1.481	1.452	1.336	1.116	0.9842	0.4557
1988	0.7641	0.7497	0.7152	0.6073	0.5374	0.3139
1989	0.4558	0.4469	0.412	0.3479	0.3149	0.1754
1990	0.5299	0.5196	0.4802	0.4054	0.3645	0.1753

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			2.854	2.797	2.591	2.165	1.904	0.7821
0.0645161290322581			1.507	1.478	1.385	1.168	1.029	0.4557
0.0967741935483871			1.481	1.452	1.336	1.116	0.9842	0.448
0.129032258064516			1.339	1.313	1.208	1.02	0.9104	0.4421
0.161290322580645			0.9259	0.9125	0.8426	0.7615	0.6809	0.3522
0.193548387096774			0.8233	0.8074	0.7446	0.6509	0.587	0.3139
0.225806451612903			0.7641	0.7497	0.7152	0.6073	0.5374	0.3111
0.258064516129032			0.7031	0.6895	0.6359	0.542	0.4985	0.3061
0.290322580645161			0.6828	0.6699	0.6191	0.5317	0.4871	0.2831
0.32258064516129			0.6684	0.6564	0.6053	0.5288	0.4811	0.2727
0.354838709677419			0.6529	0.6407	0.5925	0.5121	0.4793	0.2599
0.387096774193548			0.6262	0.6141	0.5664	0.5071	0.4645	0.2315
0.419354838709677			0.5299	0.5196	0.4802	0.4054	0.3883	0.2293
0.451612903225806			0.51	0.5003	0.4619	0.4023	0.3645	0.2188
0.483870967741936			0.4944	0.4848	0.4473	0.4015	0.3602	0.2159
0.516129032258065			0.4893	0.4801	0.4467	0.3898	0.3557	0.2139
0.548387096774194			0.4865	0.4772	0.4406	0.3817	0.3528	0.1984
0.580645161290323			0.4837	0.4745	0.4406	0.3773	0.3485	0.1949
0.612903225806452			0.4778	0.4685	0.4334	0.3735	0.3466	0.1944
0.645161290322581			0.4707	0.4613	0.4243	0.3644	0.3364	0.1819
0.67741935483871			0.4641	0.4553	0.4204	0.3636	0.3258	0.1788
0.709677419354839			0.4601	0.4514	0.4168	0.3533	0.3201	0.1754
0.741935483870968			0.4558	0.4469	0.4123	0.3511	0.3181	0.1753
0.774193548387097			0.4557	0.4469	0.412	0.3479	0.3149	0.1724
0.806451612903226			0.4439	0.4353	0.4017	0.3464	0.3134	0.1684
0.838709677419355			0.4394	0.4308	0.3972	0.3376	0.3045	0.1676
0.870967741935484			0.4381	0.4294	0.3953	0.334	0.3003	0.1589
0.903225806451613			0.4378	0.4291	0.3952	0.3333	0.3002	0.154
0.935483870967742			0.435	0.4266	0.3936	0.3307	0.2976	0.1469
0.967741935483871			0.429	0.4208	0.3885	0.3303	0.2972	0.143

0.1 1.4668 1.4381 1.3232 1.1064 0.97682 0.44741

Average of yearly averages:

0.25822

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: ORCorn

Metfile: w24232.dvf

PRZM scenario: ORswcornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method: CAM	1	integer		See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate: TAPP	0.092	kg/ha		
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	19-5	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	IR		
Flag for runoff calc.	RUNOFF	total		none, monthly or total(average of entire run)
Write Benthic Porewater File?		benthic		
Write Benthic Sediment File?		benthicsed		

stored as PACorn.out

Chemical: Tembotrione

PRZM environment: PACornC.txt modified Friday, 6 December 2002 at 09:23:10

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w14737.dvf modified Wedday, 3 July 2002 at 05:06:12

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.4145	0.4103	0.3933	0.3558	0.3298	0.1682
1962	0.5358	0.5304	0.5087	0.4616	0.4296	0.2803
1963	0.5752	0.5698	0.5478	0.4987	0.4641	0.3135
1964	1.288	1.275	1.222	1.138	1.071	0.6163
1965	0.76	0.7528	0.7235	0.661	0.6256	0.478
1966	0.84	0.8323	0.8012	0.7294	0.6913	0.4497
1967	0.7545	0.7479	0.721	0.6573	0.6141	0.4251

1968	1.19	1.179	1.13	1.027	0.9555	0.6024
1969	0.8867	0.8775	0.8401	0.7718	0.7344	0.5864
1970	0.7496	0.7428	0.7149	0.6539	0.618	0.4846
1971	0.6925	0.6863	0.6611	0.6033	0.5672	0.4218
1972	1.215	1.201	1.147	1.047	1.012	0.6392
1973	0.857	0.8497	0.8199	0.7494	0.7123	0.5531
1974	0.6857	0.6794	0.6614	0.626	0.5964	0.4662
1975	0.729	0.722	0.6937	0.633	0.5974	0.4441
1976	0.6211	0.6153	0.5919	0.5382	0.5026	0.3644
1977	0.6214	0.6152	0.5903	0.5374	0.502	0.3566
1978	0.6055	0.6016	0.5826	0.5304	0.4939	0.3337
1979	0.5718	0.5662	0.5436	0.4951	0.4613	0.3103
1980	0.5765	0.5708	0.5476	0.4982	0.4628	0.3216
1981	0.8901	0.8816	0.8467	0.7685	0.7155	0.4497
1982	2.195	2.172	2.078	1.877	1.75	0.9428
1983	1.043	1.034	0.9981	0.9226	0.8768	0.7238
1984	2.303	2.284	2.181	1.967	1.825	1.052
1985	1.877	1.859	1.786	1.676	1.576	1.052
1986	0.9093	0.9009	0.8666	0.7945	0.7568	0.5992
1987	0.6737	0.6674	0.6445	0.6036	0.5778	0.4652
1988	4.952	4.903	4.702	4.262	3.95	2.015
1989	3.66	3.627	3.492	3.193	3.005	2.056
1990	1.452	1.443	1.408	1.331	1.274	1.011

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			4.952	4.903	4.702	4.262	3.95	2.056
0.0645161290322581			3.66	3.627	3.492	3.193	3.005	2.015
0.0967741935483871			2.303	2.284	2.181	1.967	1.825	1.052
0.129032258064516			2.195	2.172	2.078	1.877	1.75	1.052
0.161290322580645			1.877	1.859	1.786	1.676	1.576	1.011
0.193548387096774			1.452	1.443	1.408	1.331	1.274	0.9428
0.225806451612903			1.288	1.275	1.222	1.138	1.071	0.7238
0.258064516129032			1.215	1.201	1.147	1.047	1.012	0.6392
0.290322580645161			1.19	1.179	1.13	1.027	0.9555	0.6163
0.32258064516129			1.043	1.034	0.9981	0.9226	0.8768	0.6024
0.354838709677419			0.9093	0.9009	0.8666	0.7945	0.7568	0.5992
0.387096774193548			0.8901	0.8816	0.8467	0.7718	0.7344	0.5864
0.419354838709677			0.8867	0.8775	0.8401	0.7685	0.7155	0.5531
0.451612903225806			0.857	0.8497	0.8199	0.7494	0.7123	0.4846
0.483870967741936			0.84	0.8323	0.8012	0.7294	0.6913	0.478
0.516129032258065			0.76	0.7528	0.7235	0.661	0.6256	0.4662
0.548387096774194			0.7545	0.7479	0.721	0.6573	0.618	0.4652
0.580645161290323			0.7496	0.7428	0.7149	0.6539	0.6141	0.4497
0.612903225806452			0.729	0.722	0.6937	0.633	0.5974	0.4497
0.645161290322581			0.6925	0.6863	0.6614	0.626	0.5964	0.4441
0.67741935483871			0.6857	0.6794	0.6611	0.6036	0.5778	0.4251
0.709677419354839			0.6737	0.6674	0.6445	0.6033	0.5672	0.4218
0.741935483870968			0.6214	0.6153	0.5919	0.5382	0.5026	0.3644
0.774193548387097			0.6211	0.6152	0.5903	0.5374	0.502	0.3566
0.806451612903226			0.6055	0.6016	0.5826	0.5304	0.4939	0.3337

0.838709677419355	0.5765	0.5708	0.5478	0.4987	0.4641	0.3216
0.870967741935484	0.5752	0.5698	0.5476	0.4982	0.4628	0.3135
0.903225806451613	0.5718	0.5662	0.5436	0.4951	0.4613	0.3103
0.935483870967742	0.5358	0.5304	0.5087	0.4616	0.4296	0.2803
0.967741935483871	0.4145	0.4103	0.3933	0.3558	0.3298	0.1682

0.1 2.2922 2.2728 2.1707 1.958 1.8175 1.052
Average of yearly averages: **0.63274**

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: PACorn

Metfile: w14737.dvf

PRZM scenario: PACornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM 1	integer		See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.092	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	29-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.

Record 17: FILTRA

 IPSCND

 UPTKF

Record 18: PLVKRT

 PLDKRT

 FEXTRC 0.5

Flag for Index Res. Run IR IR

Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

Write Benthic Porewater File? benthic

Write Benthic Sediment File? benthicsed

stored as TXCorn.out

Chemical: Tembotrione

PRZM environment: TXcornC.txt modified Friday, 6 December 2002 at 09:25:04

EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 11:34:12

Metfile: w13958.dvf modified Wedday, 3 July 2002 at 05:06:24
 Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.4718	0.4621	0.436	0.3876	0.3664	0.1824
1962	2.683	2.626	2.441	2.056	1.789	0.6937
1963	8.149	7.965	7.25	5.918	5.115	1.949
1964	1.577	1.543	1.418	1.168	1.014	0.518
1965	1.021	1	0.9591	0.8522	0.788	0.3545
1966	2.137	2.09	1.923	1.585	1.396	0.5731
1967	2.743	2.681	2.518	2.093	1.812	0.7309
1968	1.138	1.114	1.018	0.9171	0.8088	0.3681
1969	4.408	4.312	3.942	3.24	2.808	1.156
1970	0.8795	0.8608	0.7893	0.6614	0.6249	0.3372
1971	1.856	1.816	1.657	1.363	1.188	0.4876
1972	1.679	1.642	1.5	1.224	1.062	0.4589
1973	1.757	1.72	1.582	1.382	1.253	0.5316
1974	2.12	2.074	1.898	1.626	1.48	0.6217
1975	4.734	4.665	4.277	3.493	3.018	1.187
1976	3.386	3.316	3.157	2.671	2.331	0.9738
1977	3.765	3.69	3.415	2.802	2.423	1.004
1978	3.695	3.611	3.298	3.107	2.753	1.122
1979	2.444	2.394	2.301	2.164	1.959	0.8403
1980	5.382	5.268	4.948	4.385	3.879	1.522
1981	0.6679	0.6538	0.6153	0.5757	0.5487	0.308
1982	1.839	1.807	1.655	1.356	1.176	0.5026
1983	4.422	4.325	4.007	3.301	3.27	1.471
1984	0.6612	0.6469	0.5975	0.5211	0.5177	0.3129
1985	2.4	2.348	2.147	1.923	1.74	0.704
1986	2.502	2.446	2.335	1.942	1.679	0.6914
1987	0.512	0.5014	0.46	0.4348	0.404	0.2129
1988	0.9663	0.9453	0.8763	0.8127	0.7305	0.3072
1989	1.365	1.336	1.226	1.057	0.9532	0.4055
1990	1.759	1.719	1.633	1.352	1.166	0.4827

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129			8.149	7.965	7.25	5.918 5.115 1.949
0.0645161290322581			5.382	5.268	4.948	4.385 3.879 1.522
0.0967741935483871			4.734	4.665	4.277	3.493 3.27 1.471
0.129032258064516			4.422	4.325	4.007	3.301 3.018 1.187
0.161290322580645			4.408	4.312	3.942	3.24 2.808 1.156
0.193548387096774			3.765	3.69	3.415	3.107 2.753 1.122
0.225806451612903			3.695	3.611	3.298	2.802 2.423 1.004
0.258064516129032			3.386	3.316	3.157	2.671 2.331 0.9738
0.290322580645161			2.743	2.681	2.518	2.164 1.959 0.8403
0.32258064516129			2.683	2.626	2.441	2.093 1.812 0.7309
0.354838709677419			2.502	2.446	2.335	2.056 1.789 0.704
0.387096774193548			2.444	2.394	2.301	1.942 1.74 0.6937
0.419354838709677			2.4	2.348	2.147	1.923 1.679 0.6914
0.451612903225806			2.137	2.09	1.923	1.626 1.48 0.6217

0.483870967741936	2.12	2.074	1.898	1.585	1.396	0.5731
0.516129032258065	1.856	1.816	1.657	1.382	1.253	0.5316
0.548387096774194	1.839	1.807	1.655	1.363	1.188	0.518
0.580645161290323	1.759	1.72	1.633	1.356	1.176	0.5026
0.612903225806452	1.757	1.719	1.582	1.352	1.166	0.4876
0.645161290322581	1.679	1.642	1.5	1.224	1.062	0.4827
0.67741935483871	1.577	1.543	1.418	1.168	1.014	0.4589
0.709677419354839	1.365	1.336	1.226	1.057	0.9532	0.4055
0.741935483870968	1.138	1.114	1.018	0.9171	0.8088	0.3681
0.774193548387097	1.021	1	0.9591	0.8522	0.788	0.3545
0.806451612903226	0.9663	0.9453	0.8763	0.8127	0.7305	0.3372
0.838709677419355	0.8795	0.8608	0.7893	0.6614	0.6249	0.3129
0.870967741935484	0.6679	0.6538	0.6153	0.5757	0.5487	0.308
0.903225806451613	0.6612	0.6469	0.5975	0.5211	0.5177	0.3072
0.935483870967742	0.512	0.5014	0.46	0.4348	0.404	0.2129
0.967741935483871	0.4718	0.4621	0.436	0.3876	0.3664	0.1824

0.1 4.7028 4.631 4.25 3.4738 3.2448 1.4426
Average of yearly averages: 0.7003333333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:

Output File: TXCorn

Metfile: w13958.dvf

PRZM scenario: TXcornC.txt

EXAMS environment file: ir298.exv

Chemical Name: Tembotrione

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	440.8	g/mol	
Henry's Law Const.	henry	1.69e-15	atm-m ³ /mol	
Vapor Pressure	vapr	8.2e-11	torr	
Solubility	sol	283000	mg/L	
Kd	Kd		mg/L	
Koc	Koc	110	mg/L	
Photolysis half-life	kdp	172	days	Half-life
Aerobic Aquatic Metabolism	kbacw	278	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1198	days	Halfife
Aerobic Soil Metabolism	asm	46	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method: CAM	1	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate: TAPP	0.092	kg/ha		
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	20-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			

PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR IR
Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)
Write Benthic Porewater File? benthic
Write Benthic Sediment File? benthicsed

SCI-GROW Output

VERSION 2.3
ENVIRONMENTAL FATE AND EFFECTS DIVISION
OFFICE OF PESTICIDE PROGRAMS
U.S. ENVIRONMENTAL PROTECTION AGENCY
SCREENING MODEL
FOR AQUATIC PESTICIDE EXPOSURE

SciGrow version 2.3
chemical:tembotrione
time is 9/11/2006 16:44:20

Application Number of Total Use Koc Soil Aerobic
rate (lb/acre) applications (lb/acre/yr) (ml/g) metabolism (days)

0.082 2.0 0.164 2.00E+01 10.4

groundwater screening cond (ppb) = 1.39E-02

Harvested Acres of Corn by County in 2002

Corn for Grain, Corn for Silage, Sweetcorn,
Sweetcorn for Seed, and Popcorn

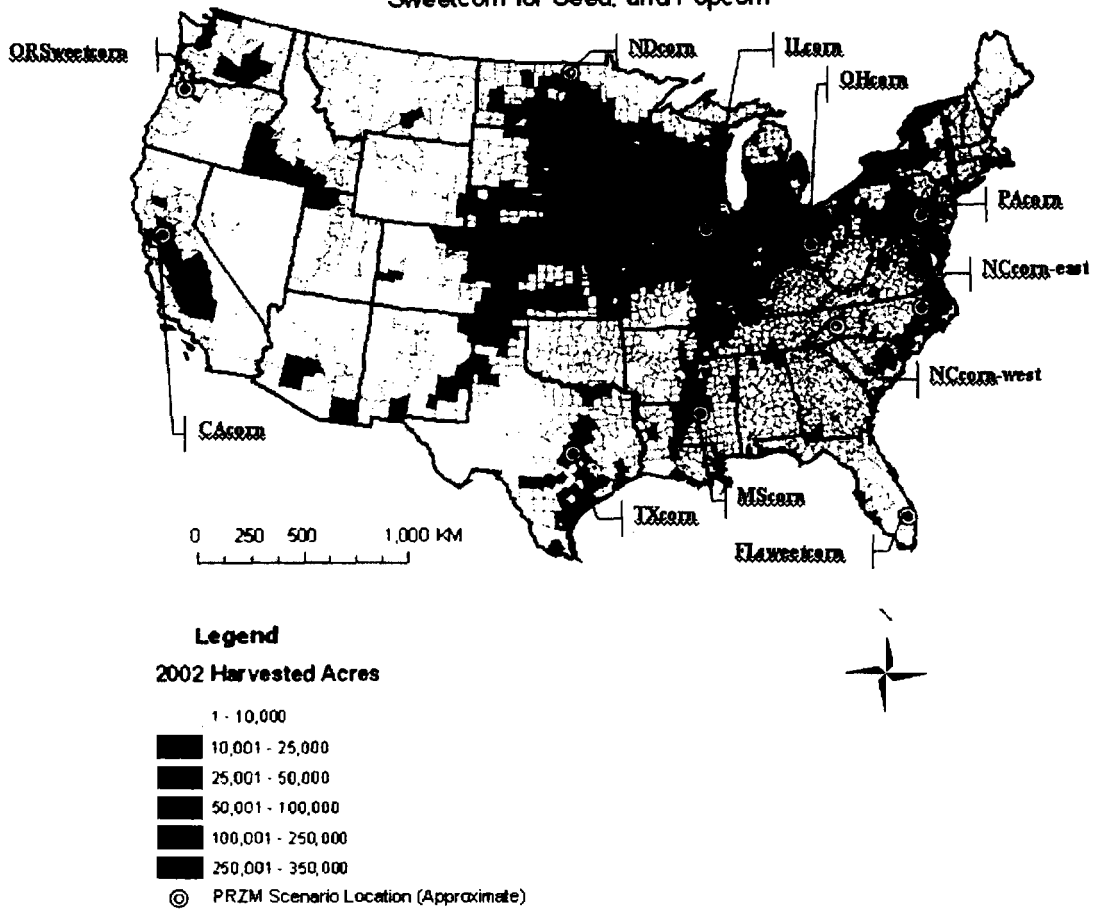


Figure 1. Distribution of corn acreage in the conterminous U.S. based on USDA 2002 Census of Agriculture (data on corn grown for seed not available).

**Harvested Acres of Corn for Grain (Field Corn)
by County in 2002**

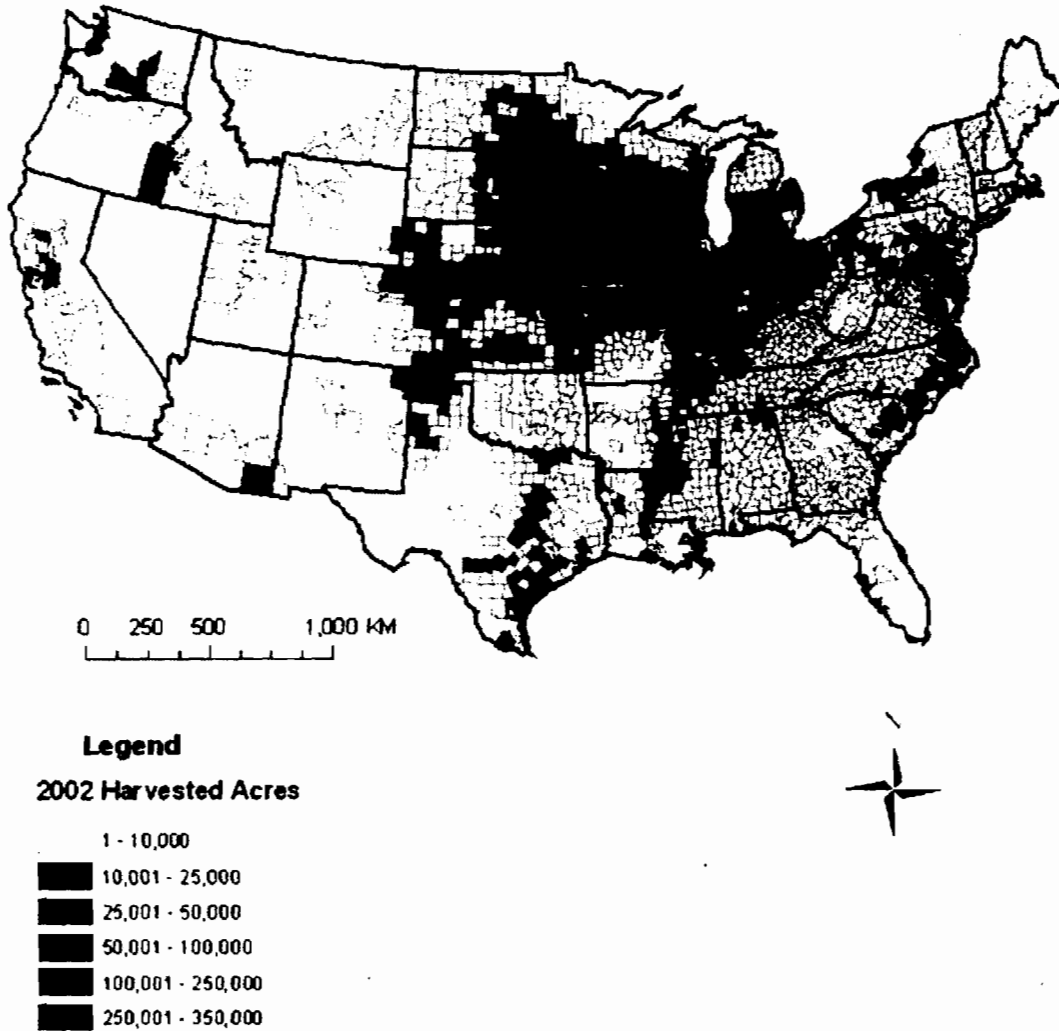


Figure 2. Distribution of corn grown for grain in the conterminous U.S. based on USDA 2002 Census of Agriculture.

Harvested Acres of Corn for Silage by County in 2002

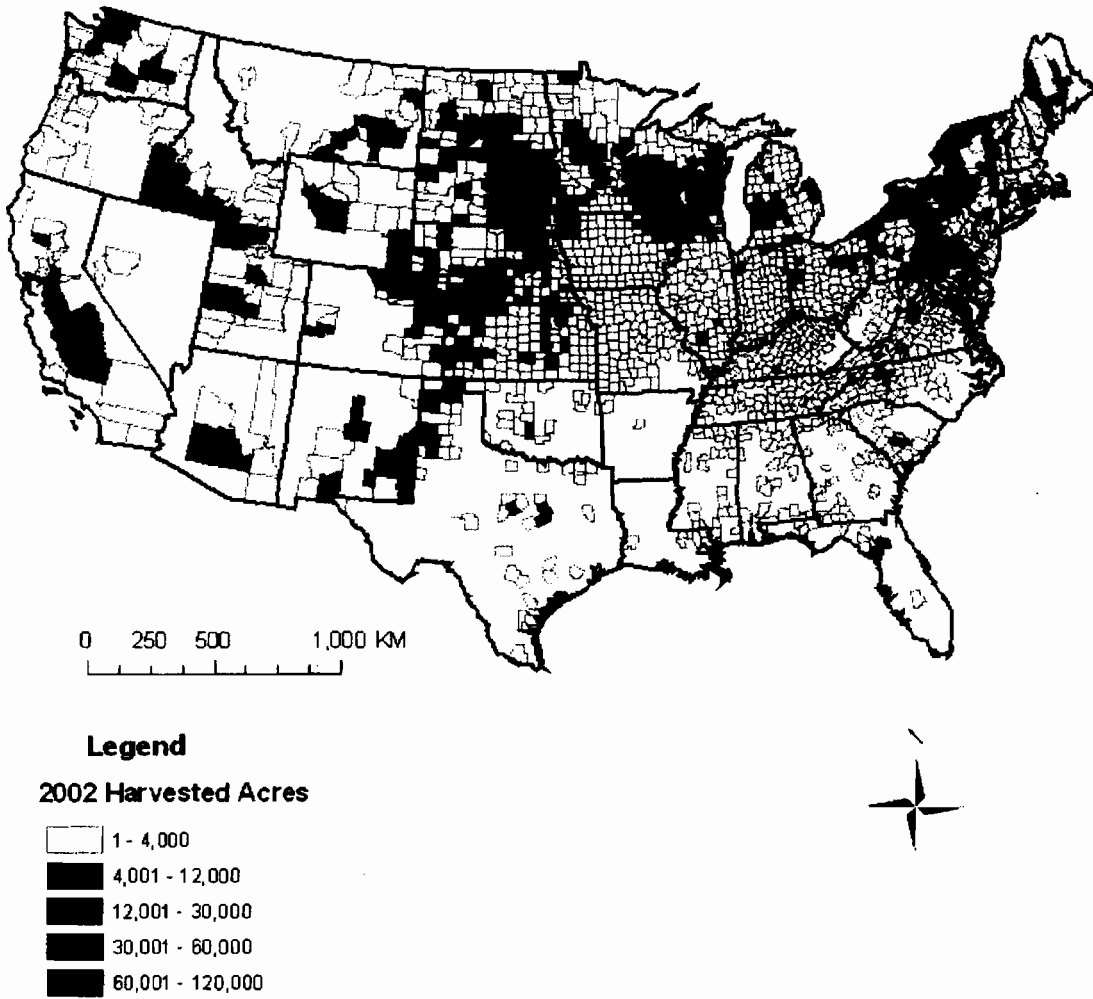


Figure 3. Distribution of corn grown for silage in the conterminous U.S. based on USDA 2002 Census of Agriculture.

Harvested Acres of Popcorn by County in 2002

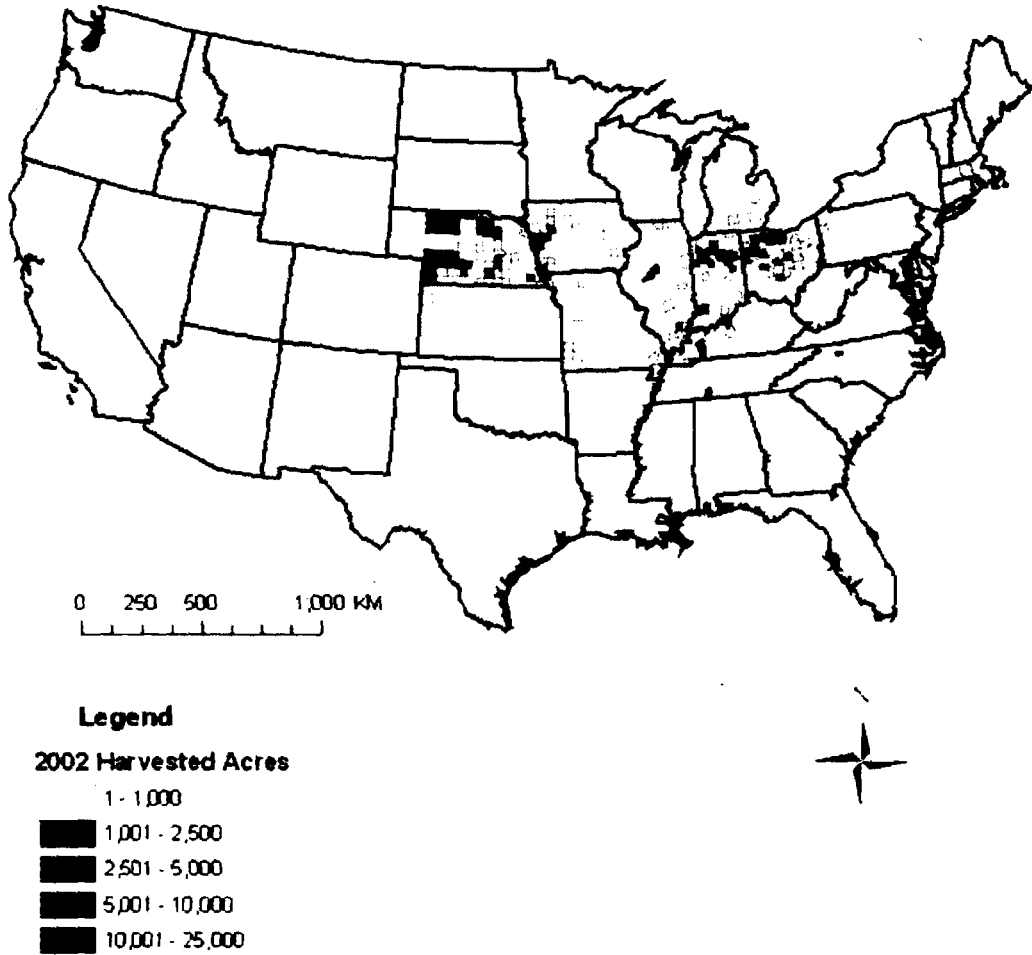


Figure 4. Distribution of popcorn grown in the conterminous U.S. based on USDA 2002 Census of Agriculture.

Harvested Acres of Sweetcorn by County in 2002

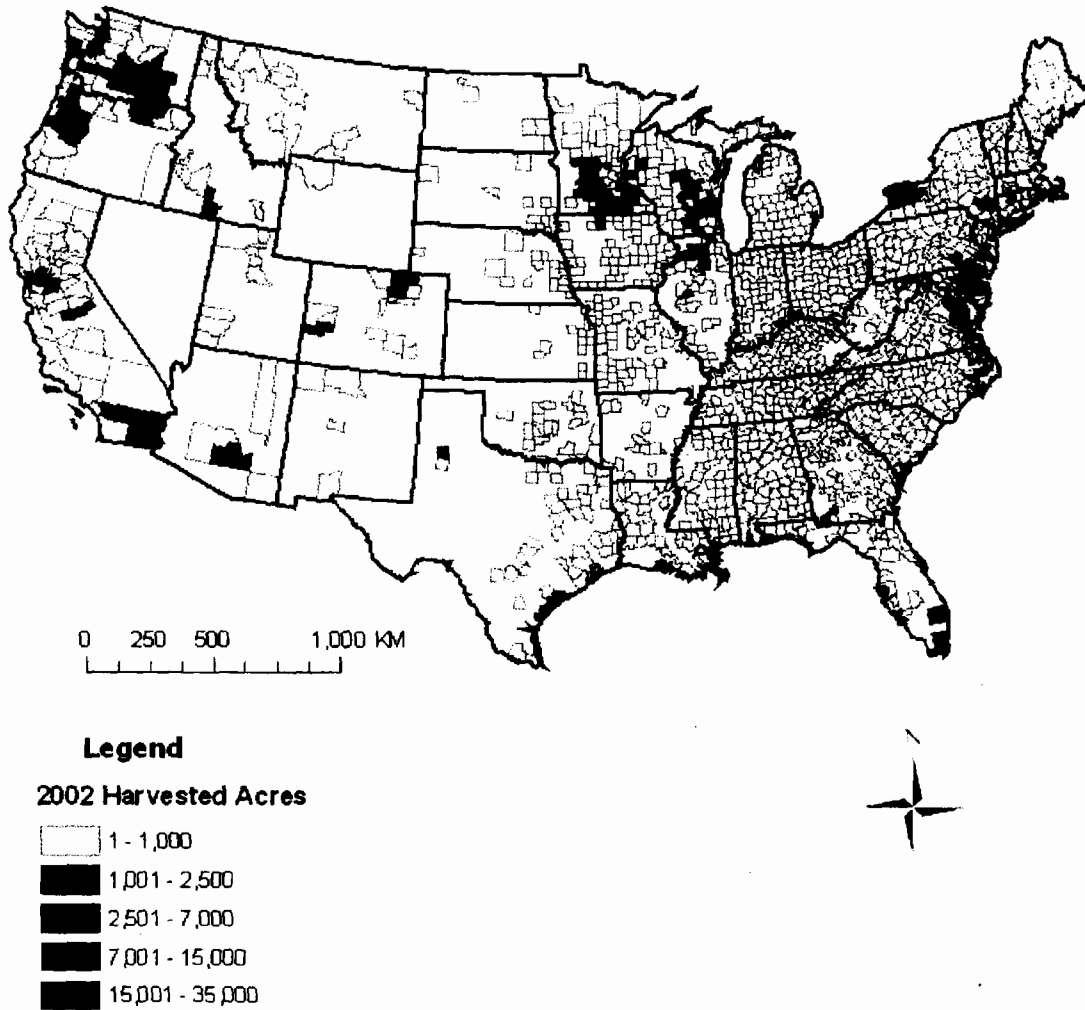


Figure 5. Distribution of sweet corn grown in the conterminous U.S. based on USDA 2002 Census of Agriculture.