

Shaughnessy No.: 128701

Date Out of FAB: DEC 2 1986

To: Richard Mountfort  
Product Manager #23  
Registration Division (TS-767)

From: Emil Regelman, Supervisory Chemist  
Review Section #3  
Exposure Assessment Branch  
Hazard Evaluation Division (TS-769)



Attached, please find the EAB review of...

Reg./File # : 8340-EG and 8340-RI  
Chemical Name: Fenoxaprop ethyl  
Type Product : Herbicide  
Product Name : Whip, Furore, HOE 033171, Acclaim  
Company Name : American Hoechst Corporation  
Purpose : Addendum to an application for full registration.

Action Code(s): 111,121 EAB #(s) : 60771 and 60772  
Date Received: 08/04/86 TAIS Code: 56  
Date Completed: 12/2/86 Monitoring submitted: \_\_\_\_\_  
Total Reviewing Time: 10.0 days Monitoring requested: \_\_\_\_\_

Deferrals to: \_\_\_\_\_ Ecological Effects Branch  
\_\_\_\_\_ Residue Chemistry Branch  
\_\_\_\_\_ Toxicology Branch

1. CHEMICAL: Common name:

Fenoxaprop ethyl

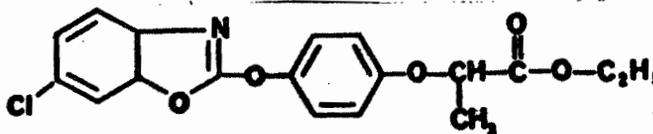
Chemical name:

Ethyl-2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propanoate

Trade name(s):

Whip, Furore, HOE 033171, Acclaim

Structure:



Formulations:

1 lb/gal EC

Physical/Chemical properties:

Physical state: Colorless, odorless solid  
Molecular formula:  $C_{18}H_{16}ClNO_5$   
Molecular weight: 361.8 g/M  
Solubility: Water, 0.9 mg/l (pH 7 at 25°C)  
Melting point: 85-87°C

2. TEST MATERIAL:

Chlorophenyl ring-labeled [ $^{14}C$ ]fenoxaprop ethyl: Studies 1, 2, 3, 4, 8, 13.  
EC: Studies 6, 7, 9, 10, 11, 12.  
Formulation not identified: Study 5.

3. STUDY/ACTION TYPE:

Application for full registration for use on turf, soybeans, and rice.

4. STUDY IDENTIFICATION:

The following studies are new or amended submittals:

Drury, P. and J. Warren. 1986. Determination of adsorption/desorption constants of  $^{14}C$ -HOE-33171. Report No. 34247. Prepared by Analytical Biochemistry Laboratories, Inc., Columbia, MO, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-4.

Gildemeister, H. 1985. Field mobility and degradation studies. Report No. (B) 107/85. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-5.

Gildemeister, H. and H.J. Jordan. 1984. HOE 033171-14C, photodegradation study on soil. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-3.

Gildemeister, H., C. Schink, and H. J. Jordan. 1986. Report on photodegradation in water. Report No. CB042/86. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-2.

Gildemeister, H. G. Schuld, and H. J. Jordan. 1985. HOE 033171-14C, photodegradation study in water. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-1.

Horton, W.F. 1986a. Aquatic field dissipation of fenoxaprop-ethyl and its metabolite residues at Greenville, Mississippi. AHC Field Trial Number: EH-85-USAK-20R; HRAV Experiment Number 86-MS-85-039. Unpublished study prepared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264058. Reference J-11.

Horton, W.E. 1986b. Aquatic field dissipation and irrigated crop accumulation potential of fenoxaprop-ethyl and its metabolite residues at Fresno, California. Unpublished study prepared and submitted by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264061. Reference J-13.

Horton, W.E. 1986c. Aquatic field dissipation and irrigated crop accumulation potential of fenoxaprop-ethyl and its metabolite residues at New Iberia, Louisiana. Unpublished study prepared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. Nos. 264059 and 264060. Reference J-12.

Johnson, J. and W. Horton. 1985. Analysis of HOE 33171 in soil from Fishers, IN. Hoechst Report No. A31375. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264056. Reference J-9.

Johnson, J. and W.E. Horton. 1986. Determination of combined fenoxaprop ethyl residues in irrigated turf, non-irrigated turf and soil samples from Pittstown, N.J. Unpublished study prepared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264057. Reference J-10.

Johnson, J. and J. O'Grodnick. 1985. Analysis of HOE 33171 in soil from Princess Anne, MD. Hoechst Report No. A31374. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054 and 264055. References J-6 and J-8.

O'Grodnick, J. and J. Grande. 1984. Comparison of total extractable versus dislodgeable pesticide residues in turf grass after application of HOE 33171. Report No. A30857. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-15.

Richards, S. and L. Wilkes. 1985. Storage stability study for HOE 33171 in soil (2 years). ADC Project No. 697-G. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264061. Reference J-16.

5. REVIEWED BY:

A. Schlosser  
Chemist  
EAB/HED/OPP

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

6. APPROVED BY:

Emil Regelman  
Supervisory Chemist  
Review Section #3, EAB/HED/OPP

Signature: 

Date: DEC 2 1986

7. CONCLUSIONS:

The following conclusion was taken from the attached Dynamac summary, and is reproduced here. EAB fully concurs with this conclusion.

DYNAMAC Conclusion

Available data are insufficient to fully assess the environmental fate of, and the exposure of humans and nontarget organisms to fenoxaprop ethyl. The submission of data relative to full registration requirements (Subdivision N) on terrestrial food crop, aquatic food crop, terrestrial nonfood, and domestic outdoor use sites is summarized below:

Photodegradation studies in water: Two studies were reviewed. The first study (Gildemeister et al., 1985, Acc. No. 264054) is scientifically valid, but does not fulfill data requirements because the distilled water was not buffered. The second study (Gildemeister et al., 1986, Acc. No. 264054) is scientifically valid, but does not fulfill data requirements because degradates comprising >10% of the applied were not identified. Differences in photodegradation rates between Studies 1 and 2 were not explained. All data are required.

8. RECOMMENDATIONS:

EAB concurs with the proposed use on residential turf.

EAB cannot concur with the proposed uses for fenoxaprop ethyl on rice, soybeans and turfgrass including sod farms, commercial turf and highway rights-of-way due to the continuing data gap Photodegradation in Water.

If a conditional registration is granted, the following label restrictions will be required: (1) For soybeans and rice, "do not rotate treated areas with small grains for 120 days and all other crops for 30 days following the last application of fenoxaprop ethyl." (2) For rice, "Do not use rice irrigation water to irrigate crops not registered for use with fenoxaprop ethyl within 14 days of the last application of this chemical." and "Do not use in areas where the commercial cultivation of catfish and crayfish is practiced".

Any future uses of fenoxaprop ethyl at application rates higher than those proposed for the uses in this review must be supported by field dissipation data using specific methods of analysis.

9. BACKGROUND:

A. Introduction

INFORMATION ON PREVIOUSLY REVIEWED STUDIES

Asshauer, J. 1981. Hydrolysis of HOE 33171. Document No. A24235, translation of Document No. A21394. American Hoechst Corporation, Somerville, NJ. Acc. No. 071800. Reference D-34.

This study was reviewed by EAB on 11/3/83 and considered adequate for the EUP. Fenoxaprop ethyl, at 0.45 ppm, degraded with a half-life of 1.75 days at 20°C in a sterile buffered pH 9 solution. In a pH 7 solution, fenoxaprop ethyl degraded with a half-life of 8 days at 40°C and 4 days at 50°C. In a pH 5 solution incubated at 50°C, 94% of the fenoxaprop ethyl remained undegraded after 5 days of incubation. 2-[4-(6-Chloro-2-benzoxazolyloxy)phenoxy]propionic acid was the only degradate.

Asshauer, J. and C. Klockner. 1982. Partition coefficient between soil and water. American Hoechst Corporation, Somerville, NJ. Acc. No. 258976. Reference J-15.

This study was reviewed by Dynamac on 1/7/86 and contributes towards the fulfillment of data requirements by showing that  $K_{ads}$  values for fenoxaprop ethyl (98.8% pure) in a water:soil slurry (100:10) were ~26 in a Versuchsfeld sand (0.8% organic carbon), ~36 in a sandy loam soil (1.0% organic carbon), and 188 in a Neuhofen sand (2.58% organic carbon).

Borrison Laboratories, Inc. 1982.  $^{14}C$ -HOE-33171 Rotational Crop Study. Borrison Project No. 1901. American Hoechst Corporation, Somerville, NJ. Acc. No. 071799. Reference D-33.

This study was reviewed by EAB on 1/4/84 and contributes towards the fulfillment of data requirements for confined accumulation in rotational crops. [ $^{14}C$ ]Fenoxaprop ethyl residues were <0.02 ppm in wheat (head, stem, and root), carrots (leaf and root), lettuce

(leaf and root), and radishes (leaf and root) planted 120 days after the sandy loam soil was treated with [<sup>14</sup>C]fenoxaprop ethyl at 0.22 lb ai/A.

Gildemeister, H. 1982. Anaerobic soil metabolism study of the herbicide HOE 33171. Document No. A24414. American Hoechst Corporation, Somerville, NJ. Acc. No. 071800. Reference D-38.

This study was reviewed by EAB on 11/3/83 and considered scientifically valid. Fenoxaprop ethyl degraded with a half-life of <1 day in flooded loamy sand and sandy loam soil incubated at 22°C in the dark. The major degradates were 2-[4-(6-chloro-2-benzoxazolyl-oxy)phenoxy]propionic acid (77.0% of applied) and 6-chloro-2,3-dihydrobenzoxazol-2-one (15.0% of applied); bound residues comprised 42.3% of the applied at 32 days post-treatment. This study does not fulfill data requirements because the soils were not completely characterized and the treated soil was not aged aerobically for 30 days or one half-life prior to establishing anaerobic conditions.

Gildemeister, H. and H. Jordan. 1982. Leaching study of the herbicide HOE 033171-<sup>14</sup>C and its degradates. Document No. A24716. American Hoechst Corporation, Somerville, NJ. Acc. No. 071800. Reference D-40.

This study was reviewed by EAB on 11/3/83 and contributes towards the fulfillment of data requirements for soil mobility by showing that aged (16 days) fenoxaprop ethyl residues were of low to intermediate mobility in one silty clay and two silt loam soils using soil TLC. Average R<sub>f</sub> values were 0.17 for 2-[4-(6-chloro-2-benzoxazolyl-oxy)phenoxy]propionic acid, 0.4 for 6-chloro-2,3-dihydrobenzoxazol-2-one, and 0.53 for 4-(6-chloro-2-benzoxazolyl-oxy)phenol.

Gildemeister, H. and E. Schmidt. 1984. Anaerobic aquatic metabolism study of the herbicide HOE 033171. Report No. A28731. American Hoechst Corporation, Somerville, NJ. Acc. No. 073932. Reference J-4A.

This study was reviewed by Dynamac on 1/7/86 and fulfills data requirements by showing that [<sup>14</sup>C]fenoxaprop ethyl (radiopurity 96.3%), at ~4 mg ai/kg, degraded with a half-life of <1 day in flooded sandy loam and loamy sand soils incubated in the dark at 22 ± 2°C. The major degradates were 2-[4-(6-chloro-2-benzoxazolyl-oxy)phenoxy]propionic acid (76.4% of applied), 6-chloro-2,3-dihydrobenzoxazol-2-one (10.7%), and 4-(6-chloro-2-benzoxazolyl-oxy)phenol (1.9%).

Gildemeister, H., E. Schmidt, and H. Jordan. 1982. Aerobic soil metabolism study of the herbicide HOE 33171-<sup>14</sup>C. Document No. A24450. American Hoechst Corporation, Somerville, NJ. Acc. No. 071800. Reference D-37.

This study was reviewed by EAB on 11/3/83. This study fulfills data requirements for aerobic soil metabolism by showing that fenoxaprop ethyl degraded with a half-life of <1 day in a loamy sand and two sandy loam soils incubated aerobically in the dark at 22°C and 40% of field capacity.

The major degradates were 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid (up to 58.2% of applied), 6-chloro-2,3-dihydrobenzoxazol-2-one (up to 11.6% of applied), and 4-(6-chloro-2-benzoxazolyloxy)phenol (up to 2.3% of applied); up to 64.6% of the applied was bound by day 32 posttreatment.

Gildemeister, H., G. Stephenson, and K. Smith. 1982. Leaching study of the herbicide HOE 0331 71-<sup>14</sup>C. Document No. A245588. American Hoechst Corporation, Somerville, NJ. Acc. No. 071800.

This study was reviewed by EAB on 11/3/83. The study contributes towards the fulfillment of data requirements for soil mobility by showing that fenoxaprop ethyl was immobile ( $R_f < 0.09$  by soil TIC) in one silty clay and two silt loam soils.

McAllister, W.A., and L. Franklin. 1984. Uptake, depuration and bioconcentration of HOE 0331 71 OH ZE99 0001 (chlorophenyl-<sup>14</sup>C) and HOE 0331 71 OH ZE99 0002 (dioxiphenyl-<sup>14</sup>C) by bluegill sunfish (Lepomis macrochirus). American Hoechst Corporation, Somerville, NJ. Acc. No. 258980. Reference J-21 and J-22.

Shaffer, S.R., J.A. Ault, and M. Williams. 1985. Characterization of <sup>14</sup>C-residues of HOE-0331 71 in water and fish tissue taken from a flow-through bioconcentration study (plus addendum). American Hoechst Corporation, Somerville, NJ. Acc. No. 258981. Reference J-23 and J-24.

These studies were reviewed by Dynamac on 1/7/86 and fulfill data requirements by showing that chlorophenyl ring-labeled [<sup>14</sup>C]fenoxaprop ethyl, at 0.01 ppm, accumulated in bluegill sunfish exposed in a flow-through system. During a 28-day exposure period, bioconcentration factors ranged from 20 to 40x in edible tissue, from 254 to 866x in viscera, and from 112 to 527x in whole fish. Accumulated residues were depurated rapidly, with > 47% elimination by day 1 and > 83% by day 14. The major component of the residues accumulated in tissue was the free acid of the parent. Smaller amounts of 6-chloro-2,3-dihydrobenzoxazol-2-one were also present. Comparable results were obtained using dioxiphenyl ring-labeled [<sup>14</sup>C]-fenoxaprop ethyl.

Schwalbe-Fehl, M. and H. Kocher. 1984. HOE 0331 71-(chlorophenyl-U-<sup>14</sup>C), confined accumulation study on rotational crops - planting of crops 30 days after treatment of the soil. Report No. A30300. American Hoechst Corporation, Somerville, NJ. Acc. No. 073935. Reference J-21.

This study was reviewed by Dynamac on 1/7/86 and fulfills data requirements by showing that [<sup>14</sup>C]fenoxaprop ethyl residues were not detected (detection limit ranged from 0.0005 to 0.039 ppm fenoxaprop prop ethyl equivalents) in radishes (tops and roots), mature spinach (leaves and stems), immature soybeans (whole plant), and carrots (tops and roots) planted in silt loam soil 29 days after the soil was treated with [<sup>14</sup>C]fenoxaprop ethyl (radio-purity ~98%) at 0.15 kg ai/ha.

[<sup>14</sup>C]Residues were 0.020 ppm fenoxaprop ethyl equivalents in the roots of mature spinach, and ranged from 0.002 to 0.009 ppm in the leaves, stems, beans, and hulls of mature soybeans. At the time of planting, the soil contained 0.003 ppm of fenoxaprop ethyl, 0.069 ppm of 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid, and 0.004 ppm each of 6-chloro-2,3-dihydrobenzoxazol-2-one and 4-(6-chloro-2-benzoxazolyloxy)phenol.

B. Directions for Use

Fenoxaprop ethyl is a systemic herbicide developed for the post-emergent control of annual and perennial grasses on terrestrial food crop, aquatic food crop, terrestrial nonfood, and domestic outdoor use sites. Proposed application rates range from 0.10 to 0.20 lb ai/A; more than one application may be necessary for adequate control. The proposed fenoxaprop ethyl formulation is a single active ingredient 1 lb/gal EC. It may be diluted with either water or crop oil (80% paraffin base petroleum oil), and may be tank mixed with bentazon. Fenoxaprop ethyl is applied using ground spray equipment or aircraft.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

See attached reviews of individual studies.

11. COMPLETION OF ONE-LINER:

A one-liner (revised 5/10/85) is on file.

12. CBI APPENDIX:

The data reviewed here are considered CBI by the registrant and must be treated as such.

**FENOXAPROP ETHYL**

**Final Report**

**Task 1: Review and Evaluation of  
Individual Studies**

**Task 2: Environmental Fate and  
Exposure Assessment**

**Contract No. 68-02-4250**

**NOVEMBER 25, 1986**

**Submitted to:**  
Environmental Protection Agency  
Arlington, VA 22202

**Submitted by:**  
Dynamac Corporation  
The Dynamac Building  
11140 Rockville Pike  
Rockville, MD 20852

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FENOXAPROP ETHYL

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## INTRODUCTION

This report is a scientific evaluation of environmental fate data submitted by American Hoechst Corporation (Acc. Nos. 264054 to 264061) to support registration of fenoxaprop ethyl as a selective postemergence herbicide for the control of annual and perennial grasses on terrestrial food crop (soybeans), aquatic food crop (rice), domestic outdoor (residential turf), and terrestrial nonfood (turfgrass including sod farms, commercial turf, and highway right-of-ways) use sites. The contribution of all studies that have been reviewed to date toward fulfillment of EPA Data Requirements for Registering Pesticides is considered under Recommendations.

Fenoxaprop ethyl is a systemic herbicide developed for the postemergent control of annual and perennial grasses on terrestrial food crop, aquatic food crop, terrestrial nonfood, and domestic outdoor use sites. Proposed application rates range from 0.10 to 0.20 lb ai/A; more than one application may be necessary for adequate control. The proposed fenoxaprop ethyl formulation is a single active ingredient 1 lb/gal EC. It may be diluted with either water or crop oil (80% paraffin base petroleum oil), and may be tank mixed with bentazon. Fenoxaprop ethyl is applied using ground spray equipment or aircraft.

CASE GS -- FENOXAPROP ETHYL STUDY 1 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

-----  
FICHE/MASTER ID No MRID CONTENT CAT 01  
Gildemeister, H. G. Schuld, and H. J. Jordan. 1985. HOE 033171-14C, photo-  
degradation study in water. Prepared by Hoechst Aktiengesellschaft, Frank-  
furt am Main, West Germany, and submitted by American Hoechst Corporation,  
Somerville, NJ. Acc. No. 264054. Reference J-1.  
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SUBST. CLASS = S.

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DIRECT RVW TIME = 3 (MH) START-DATE END DATE  
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-----

SIGNATURE:

DATE:

CONCLUSIONS:Degradation - Photodegradation in Water

Chlorophenyl ring-labeled [<sup>14</sup>C]fenoxaprop ethyl (radiochemical purity 99.0%), at 0.85 ppm, degraded with a calculated half-life of 183.4 hours in unbuffered distilled water (pH 7 at the start of the study) when irradiated with a mercury vapor lamp at 25 ± 2°C. 2-[4-(6-Chloro-2-benzoxazolyloxy)phenoxy]propionic acid, 6-chloro-2,3-dihydrobenzoxazol-2-one, 4-(6-chloro-2-benzoxazolyloxy)phenol, and six other degradates were isolated; only 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid was >10% of the applied. In the dark control, 62.4% of the applied radioactivity was identified as parent 192 hours after treatment.

In the previous review of this study (Dynamac, 1/7/86), it was concluded that the study did not fulfill data requirements because the distilled water was not buffered, it was not stated that sterile conditions were maintained, the incubation temperature for the dark control was not reported, and the artificial light was not compared to natural sunlight.

The registrant has responded that sterile conditions existed at the start of the study and efforts were made to maintain sterility, the incubation temperature for the dark control was  $22 \pm 2^\circ\text{C}$ , and 1 hour of irradiation with the artificial light used was equivalent to ~3.4 hours of natural sunlight (Figure 2, Study 2 of this report). The registrant argues that although the solution was not buffered, the pH of the solution during unbuffered photolysis should only reach pH 5.3 due to the photolytic breakdown of fenoxaprop ethyl to the free acid, 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid. However, the effect of the formation of other degradates on the acidity of the solution was not addressed, and no data were provided to support the theoretical acidity. Because (1) the half-life of fenoxaprop ethyl determined in this study is considerably longer than the half-life determined in Study 2 of this report (183.4 compared to <8 hours), (2) the pH of the buffered solution in Study 2 was measured as 5-6 during the critical period, and (3) hydrolytic degradation has been shown to decrease with increasing acidity, it would be logical to assume the acidity of the unbuffered solution in this study may have dropped below pH 5 for at least part of the study.

CASE GS -- FENOXAPROP ETHYL STUDY 2 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT  
-----FICHE/MASTER ID No MRID CONTENT CAT 01  
Gildemeister, H., C. Schink, and H. J. Jordan. 1986. Report on photodegradation in water. Report No. CB042/86. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-2.  
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SIGNATURE:

DATE:

CONCLUSIONS:Degradation - Photodegradation in Water

1. This study is scientifically valid.
2. Chlorophenyl ring-labeled [<sup>14</sup>C]fenoxaprop ethyl (radiochemical purity >99.0%), at 0.88 ppm, degraded with a half-life of <8 hours (19.2% of the applied after 8 hours) in a sterile, aqueous citrate buffered solution constantly irradiated at 1470 W/m<sup>2</sup> under a mercury vapor lamp at 25 ± 2°C. Fifteen degradates were detected and two were identified: 6-chloro-2,3-dihydrobenzoxazol-2-one (8.1% of the applied after 8 hours of irradiation) and 2-[4-(6-chloro-2-benzoxazolylloxy)phenoxy]propionic acid (3.6% of the applied after 8 hours of irradiation). In the dark control, 80.8% of the applied [<sup>14</sup>C]fenoxaprop ethyl remained undegraded at 24 hours posttreatment.
3. This study does not fulfill EPA Data Requirements for Registering Pesticides because degradates comprising >10% of the applied were not identified. Also, the large difference in photodegradation rates reported in Study I (Reference J-1) and Study 2 (Reference J-2) is not adequately explained.

## MATERIALS AND METHODS:

Uniformly-chlorophenyl ring-labeled [ $^{14}\text{C}$ ]fenoxaprop ethyl (radiochemical purity >99.0%, specific activity 24.6 mCi/g, Hoechst AG) was dissolved in acetonitrile and added to a sterile, aqueous citrate buffered (0.1 mole/L) solution (pH 5.4) at 0.88 ppm. Aliquots of the treated solution were put into the reaction compartment of photoreactors (Figure 1) that were connected to three volatile traps. Half of the solutions were irradiated continuously at  $1470 \text{ W/m}^2$  by a mercury vapor lamp (TZ 150 Z 3, Original Hanau Quarzlampen GmbH, Table 1 and Figure 2) fitted into a Solidex glass dip pipe which filtered out 90% of the wavelengths <280 nm; the remainder were incubated in the photoreactors without irradiation to serve as the dark controls. The authors estimated that 1 hour of artificial light was equivalent to 3.4 hours of sunlight. Cooling by water between the lamp and the reaction compartment kept the temperature in the sample area at  $25 \pm 2^\circ\text{C}$  during the irradiation. At intervals up to 192 hours posttreatment, the buffered solutions were completely removed from the reaction compartment and the photoreactors were rinsed repeatedly with acetone. The rinses and the buffered solutions were stored separately. At each sampling interval, volatile trapping solutions were transferred to flasks, the trapping flasks were rinsed with methanol, and the rinses were added to the trapping solutions for later analysis.

Total [ $^{14}\text{C}$ ]residues in the buffered solutions, the acetone rinses, and the trapping solutions were determined using LSC. Degradates in the buffered solutions and the acetone rinses were separated and quantified by HPLC. Degradates were identified by comparison to standard reference compounds.

## Reported Results:

[ $^{14}\text{C}$ ]Fenoxaprop ethyl in the aqueous buffered solution plus acetone rinses declined from 86.4% of the applied immediately posttreatment to 19.2% of the applied after 8 hours of irradiation (Table 2). Fifteen different degradates ranging from 0.2 to 31.8% of the applied were detected within the first 24 hours of irradiation. Only two degradates were identified: 6-chloro-2,3-dihydrobenzoxazol-2-one (8.1% of the applied at 8 hours) and 2-[4-(6-chloro-2-benzoxazolyl)oxy]propionic acid (3.6% of the applied at 8 hours). Volatiles accounted for 4.0% of the applied radioactivity after 24 hours of irradiation (Table 3).

[ $^{14}\text{C}$ ]Fenoxaprop ethyl in the dark control decreased to 80.8% of the applied at 24 hours posttreatment. Four degradates were detected; the major degradate was 6-chloro-2,3-dihydrobenzoxazol-2-one. Volatiles accounted for 0.2% of the applied at 24 hours posttreatment.

The pH of the irradiated buffered solution increased from 5.4 immediately posttreatment to 5.9 and 8.8 after 24 and 192 hours of irradiation, respectively (Table 4). The pH of the nonirradiated buffered solution decreased from 5.4 immediately posttreatment to 5.1 at 192 hours posttreatment.

DISCUSSION:

1. The registrant did not identify all degradates comprising >10% of the applied.
2. The buffer used in this study photodegraded and interacted with the test substance, causing the solution pH to increase from 5.4 immediately post-treatment to 8.8 after 192 hours of irradiation.
3. The dark control was not sampled at 8 hours posttreatment for comparison with the irradiated solution.

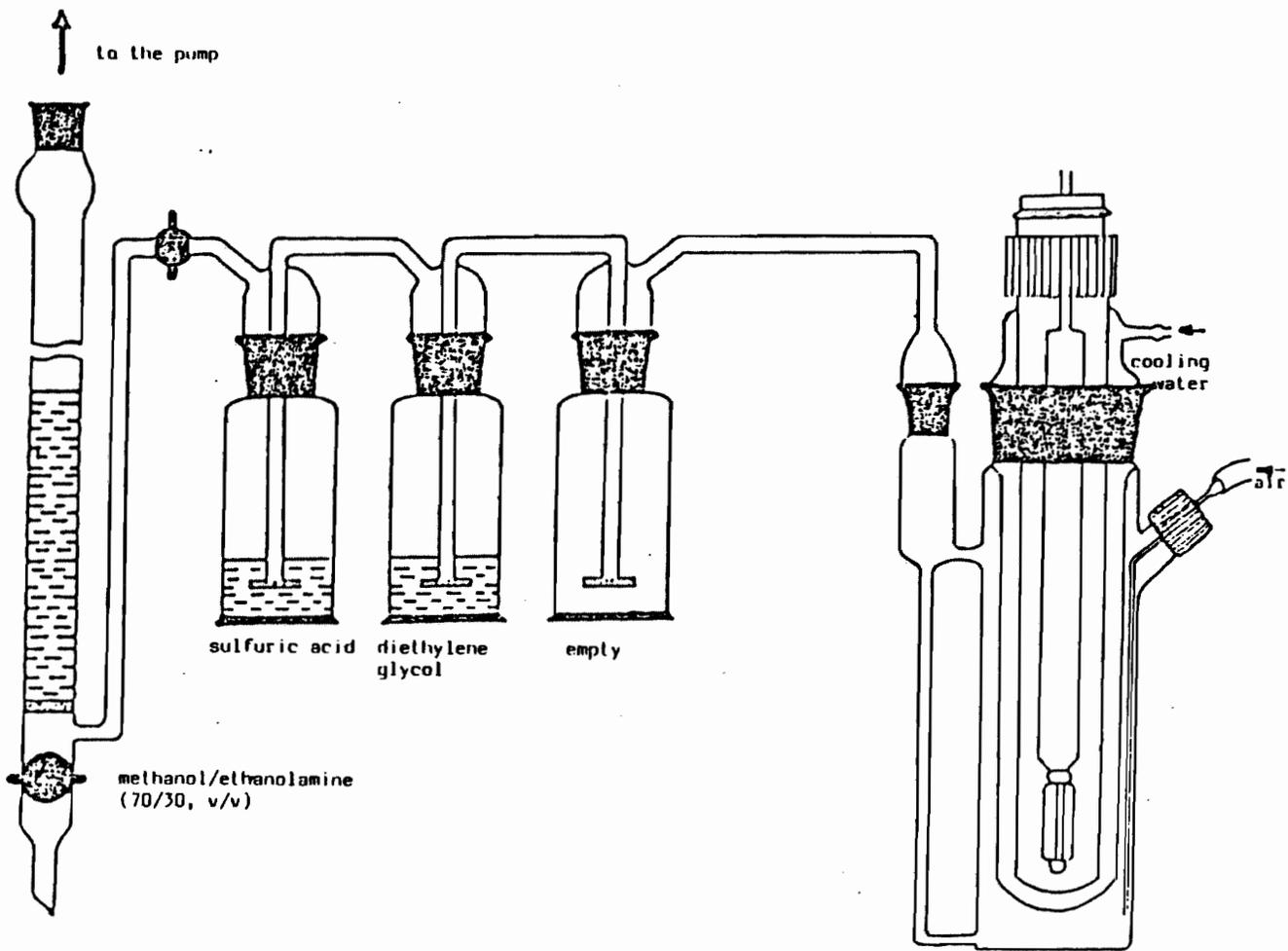


Figure 1. Photoreactor and volatile traps used in the aqueous photolysis study.

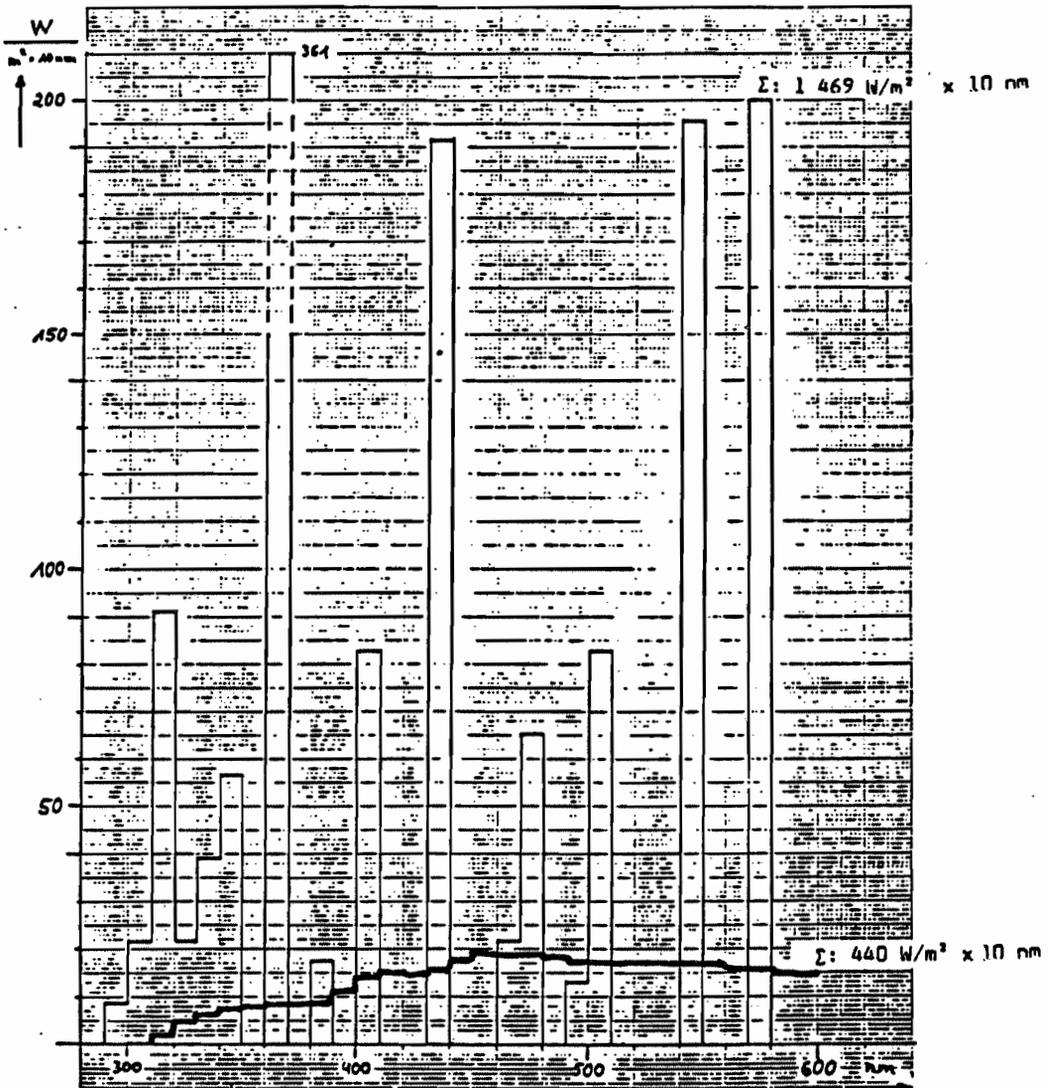


Figure 2. Spectral radiation intensity of the mercury vapor lamp TZ 150 23 (bar graph) and global radiation according to daylight phase D 65 (line graph).

Table 1. Spectral energy distribution of the mercury vapor lamp.

| Wavelength<br>(nm) | Radiation flow<br>(W) | Molar quanta<br>(per hour x 10 <sup>3</sup> ) |
|--------------------|-----------------------|---|
| 297                | 0.2                   | 2   |
| 302                | 0.5                   | 5   |
| 313                | 2.1                   | 20  |
| 326                | 0.5                   | 5   |
| 334                | 0.4                   | 4   |
| 340                | 0.5                   | 5   |
| 346                | 1.3                   | 14  |
| 361                | 2.5                   | 27  |
| 366                | 5.8                   | 64  |
| 390                | 0.4                   | 5   |
| 405/08             | 1.9                   | 23  |
| 436                | 4.4                   | 58  |
| 467                | 0.5                   | 7   |
| 480                | 1.5                   | 21  |
| 492                | 0.3                   | 4   |
| 508                | 1.9                   | 29  |
| 546                | 4.5                   | 74  |
| 577/79             | 4.6                   | 80  |

Table 2. Distribution of radioactivity (% of applied) in sterile aqueous buffered solutions treated with [<sup>14</sup>C]fenoxa-prop ethyl at 0.88 ppm.

| Sampling interval (hours) | Fenoxaprop ethyl | M1   | M2   | M3   | M4  | M5  | M6   | M7   | M8   | M9  | M10 <sup>a</sup> | M11 | M12  | M13 <sup>b</sup> | M14  | M15 |
|---------------------------|------------------|------|------|------|-----|-----|------|------|------|-----|------------------|-----|------|------------------|------|-----|
| <u>Irradiated</u>         |                  |      |      |      |     |     |      |      |      |     |                  |     |      |                  |      |     |
| 0                         | 86.4             | --   | --   | --   | --  | --  | --   | --   | --   | --  | 0.9              | --  | --   | 0.8              | --   | --  |
| 8                         | 19.2             | --   | --   | 13.2 | --  | --  | --   | 10.2 | --   | --  | 8.1              | 8.9 | 15.0 | 3.6              | 11.8 | --  |
| 24                        | 8.2              | 31.8 | --   | 4.0  | --  | 6.9 | 15.8 | 9.5  | 9.6  | 4.3 | 0.3              | --  | --   | --               | 0.2  | --  |
| 48                        | 1.5              | 11.2 | 17.6 | 20.6 | 1.2 | --  | --   | 1.3  | 16.1 | --  | 2.8              | 2.5 | 0.9  | 0.1              | --   | 0.2 |
| 96                        | 2.7              | 46.8 | --   | --   | --  | --  | --   | --   | 1.7  | 3.9 | 4.2              | 2.1 | 2.3  | 19.5             | 0.9  | --  |
| 192                       | 1.2              | 30.1 | 27.0 | 13.9 | --  | --  | 4.9  | --   | --   | --  | 0.1              | --  | --   | --               | --   | --  |
| <u>Dark control</u>       |                  |      |      |      |     |     |      |      |      |     |                  |     |      |                  |      |     |
| 24                        | 80.8             | --   | 0.2  | --   | --  | --  | --   | --   | --   | --  | 1.8              | --  | --   | --               | --   | --  |
| 48                        | 74.7             | --   | --   | --   | --  | --  | --   | --   | --   | --  | 2.1              | --  | --   | --               | --   | --  |
| 96                        | 87.1             | --   | --   | --   | --  | --  | --   | --   | --   | --  | 7.8              | --  | --   | --               | --   | --  |
| 192                       | 77.3             | --   | --   | --   | --  | --  | --   | --   | --   | --  | 11.2             | --  | --   | 7.0              | 0.1  | --  |

<sup>a</sup> M10; 6-chloro-2,3-dihydrobenzoxazol-2-one.

<sup>b</sup> M13; 2-[4-(6-chloro-2-benzoxazolyl)oxy]phenoxy]propionic acid.

Table 3. Distribution of radioactivity (% of applied) in sterile aqueous buffered solutions treated with [<sup>14</sup>C]fenoxaprop-ethyl at 0.88 ppm.

| Sampling interval (hours) | Buffer plus acetone rinse | Cumulative volatiles | Total |
|---------------------------|---------------------------|----------------------|-------|
| <u>Irradiated</u>         |                           |                      |       |
| 0                         | 88.2                      | - -                  | 88.2  |
| 8                         | 91.0                      | 1.1                  | 92.1  |
| 24                        | 90.6                      | 4.0                  | 94.6  |
| 48                        | 76.0                      | 4.8                  | 80.8  |
| 96                        | 84.9                      | 9.2                  | 94.1  |
| 192                       | 77.4                      | 10.1                 | 87.5  |
| <u>Dark control</u>       |                           |                      |       |
| 24                        | 83.4                      | 0.2                  | 83.6  |
| 48                        | 76.9                      | 0.2                  | 76.9  |
| 96                        | 94.8                      | 0.2                  | 94.8  |
| 192                       | 96.0                      | 0.1                  | 96.1  |

Table 4. Acidity (pH) values of aqueous citrate buffered solutions treated with [<sup>14</sup>C]fenoxaprop ethyl at 0.88 ppm.

| Sampling interval (hours) | Irradiated | Dark control |
|---------------------------|------------|--------------|
| 0                         | 5.4        | 5.4          |
| 8                         | 5.6        | - -          |
| 24                        | 5.9        | 5.2          |
| 48                        | 6.5        | 5.2          |
| 96                        | 8.7        | 5.2          |
| 192                       | 8.8        | 5.1          |

CASE GS -- FENOXAPROP ETHYL STUDY 3 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

-----  
FICHE/MASTER ID No MRID CONTENT CAT 01  
Gildemeister, H. and H.J. Jordan. 1984. HOE 033171-14C, photodegradation  
study on soil. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main,  
West Germany, and submitted by American Hoechst Corporation, Somerville, NJ.  
Acc. No. 264054. Reference J-3.-----  
SUBST. CLASS = S.-----  
DIRECT RVW TIME = 3 (MH) START-DATE END DATE-----  
REVIEWED BY: K. Patten  
TITLE: Staff Scientist  
ORG: Dynamac Corp., Rockville, MD  
TEL: 468-2500-----  
APPROVED BY: A. Schlosser  
TITLE: Chemist  
ORG: EAB/HED/OPP  
TEL: 557-7709

SIGNATURE:

DATE:

CONCLUSIONS:Degradation - Photodegradation on Soil

Chlorophenyl ring-labeled [<sup>14</sup>C]fenoxaprop ethyl (radiochemical purity 98%) degraded with a half-life of <4 hours on loamy sand soil samples irradiated with a mercury vapor lamp, an interval equivalent to <32 hours of natural sunlight. Degradation in the dark control occurred at approximately the same rate, with <4% of the applied fenoxaprop ethyl remaining undegraded in both irradiated and control samples at 45 hours (indicating that degradation was due to biotic and hydrolytic rather than photolytic reactions). The major degradate formed was 2-[4-(6-chloro-2-benzoxazolyl)oxy]phenoxy]propionic acid.

In the previous review of this study (Dynamac, 1/7/86), it was concluded that the study did not fulfill data requirements because the incubation temperature of both the dark control and treated samples was not reported, no material balance was provided for the dark control soils, and the material balance for irradiated samples declined to <75% of the applied after 32 hours of irradiation.

The registrant has responded that the temperature for all samples during the entire study was  $27 \pm 2^\circ\text{C}$ , has included a material balance for the dark control (Table 1), and has provided several explanations for the low material balance at the end of the study, including adsorption of volatiles to the walls of the photoreactor and loss of volatiles through leaks in the system. The temperature and dark control material balance data are satisfactory; since the study need only have been conducted until the half-life (<4 hours) of fenoxaprop ethyl was reached and the material balance during that interval was <95%, the explanation for the loss of material at 32 hours will suffice.

This study fulfills data requirements by providing information on the photodegradation of fenoxaprop ethyl on soil.

Table 1. Distribution of radioactivity (% of applied) in loamy sand soil.

| Sampling interval (hours) | Extractable      |                     |                 | Unextractable | Total <sup>c</sup> |                 |
|---------------------------|------------------|---------------------|-----------------|---------------|--------------------|-----------------|
|                           | Fenoxaprop ethyl | M2                  | M4 <sup>a</sup> |               |                    | M5 <sup>b</sup> |
|                           |                  | <u>Irradiated</u>   |                 |               |                    |                 |
| 8                         | 14.5             | --                  | 64.1            | 5.0           | 1.0                | 84.6            |
| 45                        | 3.8              | --                  | 24.2            | 1.7           | 28.0               | 57.7            |
|                           |                  | <u>Dark Control</u> |                 |               |                    |                 |
| 8                         | 7.7              | --                  | 67.5            | 7.7           | 0.9                | 83.8            |
| 45                        | --               | 3.5                 | 42.5            | --            | 29.8               | 75.8            |

a 2-[4-(6-Chloro-2-benzoxazolyl)oxy]phenoxy)propionic acid.

b 6-Chloro-2,3-dihydrobenzoxazol-2-one.

c Cumulative volatile radioactivity from the irradiated plus dark control samples was 2.3% of the applied at 8 hours posttreatment and 3.6% of the applied at 45 hours posttreatment. Because of the experimental design, volatilization from the irradiated and dark control samples could not be differentiated.

CASE GS -- FENOXAPROP ETHYL STUDY 4 PM --

CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID No MRID CONTENT CAT 01  
 Drury, P. and J. Warren. 1986. Determination of adsorption/desorption constants of <sup>14</sup>C-HOE-33171. Report No. 34247. Prepared by Analytical Biochemistry Laboratories, Inc., Columbia, MO, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-4.

SUBST. CLASS = S.

DIRECT RVW TIME = 6 (MH) START-DATE END DATE

REVIEWED BY: T. Colvin-Snyder  
 TITLE: Staff Scientist  
 ORG: Dynamac Corp., Rockville, MD  
 TEL: 468-2500

APPROVED BY: A. Schlosser  
 TITLE: Chemist  
 ORG: EAB/HED/OPP  
 TEL: 557-7709

SIGNATURE:

DATE:

CONCLUSIONS:

Mobility - Leaching and Adsorption/Desorption

1. This study is scientifically valid.
2. Fenoxaprop ethyl was slightly mobile in two loamy sand soils, two silt loam soils, and an aquatic sediment (clay). [<sup>14</sup>C]Fenoxaprop ethyl (radiochemical purity 95.6%), at 0.1-10.0 µg/ml, was adsorbed with Freundlich K<sub>ads</sub> values ranging from 57.4 to 130; the slopes (n) of the adsorption isotherms were 0.81-1.00. Freundlich desorption coefficients (K<sub>des</sub>) ranged from 24.0 to 71.5.
3. This study fulfills EPA Data Requirements for Registering Pesticides by providing information on the mobility (batch equilibrium) of unaged fenoxaprop ethyl in four soils and an aquatic sediment.

MATERIALS AND METHODS:

Duplicate samples (0.5 gm) of each of five soils, ranging in texture from loamy sand to clay and including an aquatic sediment, were treated with

with 10 ml of 0.01 M calcium nitrate solutions containing [ $^{14}\text{C}$ ]fenoxaprop ethyl (radiochemical purity 95.6%, specific activity 21.7  $\mu\text{Ci}/\text{mg}$ , Hoechst-Roussel Agri-Vet Co.) at 0.1, 1.0, 5.0, and 10.0  $\mu\text{g}/\text{ml}$  (Table 1). The soil:solution slurries were shaken for a minimum of 24 hours at  $25 \pm 1^\circ\text{C}$  (Missouri loamy sand soil:solution slurries were shaken for a minimum of 6 hours). The samples were centrifuged and filtered, and the filtrate was analyzed for radioactivity using LSC.

Desorption of [ $^{14}\text{C}$ ]fenoxaprop ethyl from the soils was studied by replacing the supernatant removed from each soil sample in the adsorption portion of the study with an equal volume of pesticide-free calcium nitrate solution. The samples were shaken for ~24-48 hours at  $25 \pm 1^\circ\text{C}$ , centrifuged, and filtered, and the filtrate was analyzed for radioactivity by LSC. Samples treated with 10  $\mu\text{g}/\text{ml}$  [ $^{14}\text{C}$ ]fenoxaprop ethyl were desorbed a second time. Following the desorption phase, the soils were dried and analyzed for adsorbed [ $^{14}\text{C}$ ]residues by LSC following combustion.

#### REPORTED RESULTS:

Freundlich adsorption coefficients ( $K_{\text{ads}}$ ) ranged from 57.4 to 130, and the slopes of the adsorption isotherms ( $n$ ) ranged from 0.812 to 1.00 (Table 2). Adsorption increased with increasing organic matter;  $K_{\text{oc}}$  ranged from 11230 to 18880.

Freundlich desorption coefficients ( $K_{\text{des}}$ ) ranged from 24.0 to 71.5, and the slopes of the desorption isotherms ( $n$ ) ranged from 0.899 to 1.30. The material balances were 77.1-131% of the applied.

#### DISCUSSION:

Because of the rapid degradation of fenoxaprop ethyl (<1 day), it is probable that the majority of [ $^{14}\text{C}$ ]residues in the desorption portion of the study were degradates rather than parent.

Table 1. Soil characteristics.

| Source                        | Soil type  | Sand       | Silt | Clay | Organic matter | pH  | CEC (meq/100 g) |
|-------------------------------|------------|------------|------|------|----------------|-----|-----------------|
|                               |            | %<br>_____ |      |      | _____          |     |                 |
| Missouri                      | Loamy sand | 82.0       | 14.0 | 4.0  | 0.7            | 8.0 | 7.7             |
| Maryland                      | Loamy sand | 84.0       | 10.0 | 6.0  | 1.1            | 6.1 | 3.0             |
| Maryland                      | Silt loam  | 26.0       | 52.0 | 22.0 | 1.9            | 5.9 | 5.1             |
| Mississippi                   | Silt loam  | 16.0       | 58.0 | 26.0 | 2.0            | 6.4 | 12.8            |
| Aquatic sediment <sup>a</sup> | Clay       | 8.0        | 34.0 | 58.0 | 2.4            | 6.7 | 25.8            |

<sup>a</sup> This soil was obtained from an in-use rice paddy.

Table 2. Concentration ( $\mu\text{g}$ ) of [ $^{14}\text{C}$ ]fenoxaprop ethyl residues following the adsorption and desorption phases and the corresponding Freundlich  $K_{\text{ads}}$  and  $K_{\text{des}}$  values.

| Source           | Soil type  | Initial concentration in slurry | Concentration in solution following adsorption | Concentration in solution |                  |                  |                   |                  |                  |
|------------------|------------|---------------------------------|--|---------------------------|------------------|------------------|-------------------|------------------|------------------|
|                  |            |                                 |  | $K_{\text{ads}}$          | $n_{\text{ads}}$ | First desorption | Second desorption | $K_{\text{des}}$ | $n_{\text{des}}$ |
| Missouri         | Loamy sand | --                              | --   | 57.4                      | 0.84             | --               | --                | 24.0             | 1.30             |
|                  |            | 0.38                            | 0.16   | --                        | --               | 0.04             | --                | --               | --               |
|                  |            | 11.7                            | 4.64   | --                        | --               | 2.73             | --                | --               | --               |
|                  |            | 39.0                            | 9.85   | --                        | --               | 18.1             | --                | --               | --               |
|                  |            | 92.3                            | 17.0   | --                        | --               | 31.9             | 26.65             | --               | --               |
| Maryland         | Loamy sand | --                              | --   | 68.7                      | 0.81             | --               | --                | 55.1             | 0.90             |
|                  |            | 1.00                            | 0.35   | --                        | --               | 0.24             | --                | --               | --               |
|                  |            | 9.23                            | 3.58   | --                        | --               | 1.79             | --                | --               | --               |
|                  |            | 34.0                            | 10.3   | --                        | --               | 11.0             | --                | --               | --               |
|                  |            | 89.5                            | 10.4   | --                        | --               | 10.5             | 15.50             | --               | --               |
| Maryland         | Silt loam  | --                              | --   | 92.8                      | 0.89             | --               | --                | 70.8             | 0.98             |
|                  |            | 1.00                            | 0.23   | --                        | --               | 0.17             | --                | --               | --               |
|                  |            | 9.23                            | 2.60   | --                        | --               | 1.91             | --                | --               | --               |
|                  |            | 34.0                            | 8.26   | --                        | --               | 7.6              | --                | --               | --               |
|                  |            | 89.5                            | 9.20   | --                        | --               | 11.9             | 21.60             | --               | --               |
| Mississippi      | Silt loam  | --                              | --   | 109.0                     | 0.86             | --               | --                | 71.5             | 0.96             |
|                  |            | 1.00                            | 0.23   | --                        | --               | 0.18             | --                | --               | --               |
|                  |            | 9.23                            | 2.51   | --                        | --               | 2.05             | --                | --               | --               |
|                  |            | 34.0                            | 7.37   | --                        | --               | 7.04             | --                | --               | --               |
|                  |            | 89.5                            | 7.90   | --                        | --               | 13.2             | 26.85             | --               | --               |
| Aquatic sediment | (Clay)     | --                              | --   | 130.0                     | 1.00             | --               | --                | 68.7             | 1.18             |
|                  |            | 1.00                            | 0.19   | --                        | --               | 0.11             | --                | --               | --               |
|                  |            | 9.23                            | 1.50   | --                        | --               | 1.62             | --                | --               | --               |
|                  |            | 34.0                            | 4.98   | --                        | --               | 5.35             | --                | --               | --               |
|                  |            | 89.5                            | 9.58   | --                        | --               | 20.5             | 26.10             | --               | --               |

CASE GS -- FENOXAPROP ETHYL STUDY 5 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 90 - FORMULATION NOT IDENTIFIED  
-----FICHE/MASTER ID No MRID CONTENT CAT 01  
Gildemeister, H. 1985. Field mobility and degradation studies. Report No.  
(B) 107/85. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West  
Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc.  
No. 264054. Reference J-5.  
-----SUBST. CLASS = S.  
-----DIRECT RVW TIME = 12 (MH) START-DATE END DATE  
-----REVIEWED BY: W. Higgins  
TITLE: Staff Scientist  
ORG: Dynamac Corp., Rockville, MD  
TEL: 468-2500  
-----APPROVED BY: A. Schlosser  
TITLE: Chemist  
ORG: EAB/HED/OPP  
TEL: 557-7709  
-----

SIGNATURE:

DATE:

CONCLUSIONS:Field Dissipation - Terrestrial

This study is scientifically invalid because <18% of the radioactivity recovered at the first sampling interval was the test substance, fenoxaprop ethyl. In addition, this study would not fulfill EPA Data Requirements for Registering Pesticides because the pesticide formulation was not specified, the test substance was applied in combination with another pesticide, data were reported as percent of recovered rather than percent of applied, raw data were not provided, and the microplots were too small to be typical of actual use conditions.

MATERIALS AND METHODS:

A solution containing 12 mg of uniformly phenyl-labeled [<sup>14</sup>C]fenoxaprop ethyl (radiochemical purity 98%, specific activity 28.3 mCi/g, Hoechst AG) and 24 mg of nonlabeled fenthiaaprop ethyl (purity 98.8%, Hoechst AG) in 200 µl of formulation blank (uncharacterized) was mixed with 500 ml water and sprinkled in late June, 1983, on two field microplots of either Conestoga silt loam soil (23.1% sand, 55.6% silt, 21.3% clay,

4.4% organic matter, pH 7.0, CEC 33.3 meq/100 g) or Brookston Family sandy loam soil (54.2% sand, 27.0% silt, 18.8% clay, 2.3% organic matter, pH 7.0, CEC 19.3 meq/100 g) at 333 g [<sup>14</sup>C]fenoxaprop ethyl/ha. The microplots were located in Elora and Ridgeway, Canada. Each plot was surrounded by a sheet of stainless steel which was folded to form a 60 cm x 60 cm x 50 cm cube (0.36 m<sup>2</sup> surface area) that was open at the top and bottom. The soil was sampled at intervals up to 128 days post-treatment by taking five cores (1.9 cm in diameter) from each microplot. Each core was divided into seven 5-cm segments and stored at -17°C until analysis.

Each soil sample was extracted with acetonitrile:water (80:20). The extract was concentrated and an aliquot analyzed for total radioactivity using LSC. Additional aliquots were analyzed for degradates using TLC on silica gel plates developed in toluene:ethyl acetate:acetic acid:water (50:50:1:0.5, v:v:v:v). Radiolabeled residues were visualized by autoradiography and identified by comparison to reference standards (visualized with UV light). [<sup>14</sup>C]Compounds were scraped off the plate and quantified by LSC. Radioactivity remaining in extracted soil was determined using LSC following combustion.

#### REPORTED RESULTS:

During the field tests, temperatures ranged from -3.9 to 29.7°C in the vicinity of the Conestoga silt loam soil plots and from -2.5 to 32.0°C in the vicinity of the Brookston Family sandy loam soil. Cumulative precipitation is reported in Table 2.

In the Conestoga silt loam soil, [<sup>14</sup>C]fenoxaprop ethyl declined from 18.1% of recovered at 3 hours posttreatment to <0.2% of recovered by 16 days (Table 1). 2-[4-(6-Chloro-2-benzoxazolyl)oxy]propionic acid decreased from ~60% of the recovered at <8 hours posttreatment to 0.6% of the recovered at 128 days posttreatment. 6-Chloro-2,3-dihydrobenzoxazol-2-one ranged from 3.1 to 24.5% of the recovered. Unextractable radioactivity increased from 17.2% of the recovered at 3 hours to 96.3% of recovered at day 128. Radioactivity was detected to a depth of 25 cm on day 128 (Table 2).

In the Brookston Family sandy loam soil, [<sup>14</sup>C]fenoxaprop ethyl declined from 13.3% of the recovered at 3 hours to <2.7% of the recovered by day 32 (Table 1). 2-[4-(6-Chloro-2-benzoxazolyl)oxy]propionic acid decreased from ~44-58% of the recovered during the first two days posttreatment to 0.7% of the recovered at 128 days posttreatment. 6-Chloro-2,3-dihydrobenzoxazol-2-one was detected in amounts ranging from 2.1 to 7.9% of the recovered. Unextractable radioactivity ranged from a low of 33.5% of the recovered on day 2 to 91.7% of the recovered on day 128. Radioactivity was detected to a depth of 35 cm on day 128 (Table 2).

#### DISCUSSION:

1. The first sampling was taken 3 hours posttreatment, at which time the [<sup>14</sup>C]fenoxaprop ethyl level was 18.1% of the recovered in Conestoga silt loam soil and 13.3% of the recovered in Brookston Family sandy loam soil.

2. The radiolabeled pesticide was formulated, but the formulation was not specified.
3. Fenoxaprop ethyl, the chemical of interest, was applied in combination with fenthiaprop ethyl. This may have affected the dissipation of the test substance.
4. Data were presented as percent of the recovered instead of percent of the applied.
5. Raw data were not provided.
6. The microplots were too small to be representative of actual use conditions.
7. The detection limit and recovery from fortified samples were not specified.

Table 1. Distribution of radioactivity (% of the recovered) in field plots of Conestoga silt loam and Brookston Family sandy loam soils treated with [<sup>14</sup>C]-fenoxaprop ethyl at 333 g/ha.

| Sampling interval                       | Fenoxaprop ethyl | 2-[4-(6-Chloro-2-benzoxazolyl-oxy)-phenoxy]propionic acid | 6-Chloro-2,3-dihydro-benzoxazol-2-one | Unextractable |
|---|------------------|---|---------------------------------------|---------------|
| <u>Conestoga silt loam soil</u>         |                  |   |                                       |               |
| 3 hours                                 | 18.1             | 56.3  | 8.4                                   | 17.2          |
| 8 hours                                 | 9.7              | 58.9  | 11.5                                  | 19.9          |
| 1 day                                   | 4.3              | 35.8  | 14.6                                  | 45.3          |
| 2 days                                  | 2.7              | 32.2  | 17.8                                  | 47.4          |
| 4 days                                  | 2.1              | 21.5  | 24.5                                  | 51.9          |
| 16 days                                 | 0.2              | 7.2   | 13.6                                  | 79.0          |
| 32 days                                 | --               | --  | --                                    | --            |
| 64 days                                 | ND <sup>a</sup>  | 5.9   | 17.3                                  | 76.9          |
| 128 days                                | ND               | 0.6   | 3.1                                   | 96.3          |
| <u>Brookston Family sandy loam soil</u> |                  |   |                                       |               |
| 3 hours                                 | 13.3             | 44.5  | 0.0                                   | 42.2          |
| 8 hours                                 | 3.9              | 57.7  | 0.0                                   | 38.4          |
| 1 day                                   | 5.1              | 53.9  | 4.0                                   | 36.8          |
| 2 days                                  | 6.2              | 55.2  | 5.2                                   | 33.5          |
| 4 days                                  | 13.4             | 49.0  | 2.1                                   | 35.5          |
| 16 days                                 | 5.3              | 21.0  | 5.3                                   | 67.6          |
| 32 days                                 | 2.7              | 7.1   | 7.9                                   | 82.3          |
| 64 days                                 | ND               | 3.2   | 7.0                                   | 89.8          |
| 128 days                                | ND               | 0.7   | 7.6                                   | 91.7          |

<sup>a</sup> Not detected; the detection limit was not specified.

Table 2. Distribution of radioactivity (% of the recovered) in Conestoga silt loam and Brookston Family sandy loam soils treated with [<sup>14</sup>C]fenoxaprop ethyl at 333 g/ha.<sup>a</sup>

| Sampling interval                       | 0-5 cm | 5-10 cm | 10-15 cm        | 15-20 cm | 20-25 cm | 25-30 cm | 30-35 cm | Cumulative precipitation (mm) |
|---|--------|---------|-----------------|----------|----------|----------|----------|-------------------------------|
| <u>Conestoga silt loam soil</u>         |        |         |                 |          |          |          |          |                               |
| 3 hours                                 | 99.0   | 1.0     | ND <sup>b</sup> | ND       | ND       | ND       | ND       | 0                             |
| 8 hours                                 | 98.8   | 1.2     | ND              | ND       | ND       | ND       | ND       | 0                             |
| 1 day                                   | 97.3   | 2.7     | ND              | ND       | ND       | ND       | ND       | 0                             |
| 2 days                                  | 98.5   | 1.5     | ND              | ND       | ND       | ND       | ND       | 0                             |
| 4 days                                  | 95.5   | 4.0     | 0.5             | ND       | ND       | ND       | ND       | 0                             |
| 16 days                                 | 91.0   | 6.8     | 2.2             | ND       | ND       | ND       | ND       | 15.1                          |
| 32 days                                 | --     | --      | --              | --       | ND       | ND       | ND       | --                            |
| 64 days                                 | 95.0   | 1.8     | 1.5             | 1.7      | ND       | ND       | ND       | 148.5                         |
| 128 days                                | 85.3   | 5.2     | 4.0             | 3.5      | 2.0      | ND       | ND       | 382.5                         |
| <u>Brookston Family sandy loam soil</u> |        |         |                 |          |          |          |          |                               |
| 3 hours                                 | 87.3   | 10.2    | 2.5             | ND       | ND       | ND       | ND       | --                            |
| 8 hours                                 | 91.5   | 7.8     | 0.7             | ND       | ND       | ND       | ND       | 0                             |
| 1 day                                   | 92.3   | 6.5     | 1.2             | ND       | ND       | ND       | ND       | 0                             |
| 2 days                                  | 96.5   | 3.5     | ND              | ND       | ND       | ND       | ND       | 0.2                           |
| 4 days                                  | 88.8   | 8.3     | 1.7             | 1.2      | ND       | ND       | ND       | 0.2                           |
| 16 days                                 | 86.8   | 9.2     | 3.0             | 1.0      | ND       | ND       | ND       | 21.4                          |
| 32 days                                 | 85.0   | 4.0     | 6.3             | 3.5      | 1.2      | ND       | ND       | 79.5                          |
| 64 days                                 | 66.0   | 10.0    | 8.0             | 10.5     | 5.5      | ND       | ND       | 176.5                         |
| 128 days                                | 55.3   | 5.0     | 9.3             | 10.7     | 12.5     | 6.7      | 0.5      | 355.3                         |

<sup>a</sup> Conestoga silt loam soil was treated on June 21, 1983. Brookston Family sandy loam soil was treated on June 28, 1983.

<sup>b</sup> Not detected; the detection limit was not specified.

CASE GS -- FENOXAPROP ETHYL STUDY 6 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC)  
-----FICHE/MASTER ID No MRID CONTENT CAT 01  
Johnson, J. and J. O'Grodnick. 1985. Analysis of HOE 33171 in soil from  
Princess Anne, MD. Hoechst Report No. A31374. Prepared and submitted by  
American Hoechst Corporation, Somerville, NJ. Acc. No. 264054 and 264055.  
References J-6 and J-8.  
-----SUBST. CLASS = S.  
-----DIRECT RVW TIME = 2 (MH) START-DATE END DATE  
-----REVIEWED BY: K. Patten  
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TITLE: Chemist  
ORG: EAB/HED/OPP  
TEL: 557-7709  
-----

SIGNATURE:

DATE:

CONCLUSIONS:Field Dissipation - Terrestrial

Fenoxaprop ethyl residues dissipated with a half-life of 4-8 and 8-14 days in the 0- to 3-inch depth of loam soil located in Maryland that was treated with fenoxaprop ethyl (1 lb/gal EC) at 0.2 and 1.0 lb ai/A, respectively (Table 1). Fenoxaprop ethyl residues were not detected (<0.02 ppm) in the 3- to 6- and 6- to 12-inch depths of soil treated at 0.2 lb ai/A, and were <0.03 ppm in the soil treated at 1.0 lb ai/A at all sampling intervals.

In the previous review of this study (Dynamac, 1/7/86), it was concluded that this study was scientifically invalid because the analytical method was inadequate (recoveries ranged from 65 to 125%) to accurately assess the dissipation of fenoxaprop ethyl from soil. In addition, this study would not fulfill data requirements because the method was nonspecific, the patterns of decline of fenoxaprop ethyl and formation and decline of its degradates were not addressed, the soil pH and CEC were not reported, field test data including air and soil temperatures and precipitation amounts were incomplete, pesticides other than fenoxaprop ethyl

were not characterized, and more than one pesticide was applied to the soil which may have affected the dissipation rate of fenoxaprop ethyl.

The registrant has supplied additional recovery data for the method that shows recoveries from twelve soil samples fortified at 0.02 ppm ranged from 65 to 150%, from thirty samples fortified at 0.05 ppm ranged from 52 to 140%, from ten samples fortified at 0.10 ppm ranged from 61 to 102%, and from one sample fortified at 0.20 ppm was 56%; thus, the method is quite variable at lower concentrations and less variable (but underestimates) at higher concentrations. This pattern is fairly typical of most nonradiolabeled analytical methods and, at the concentrations dealt with in this study (<0.74 ppm) is acceptable; the study can be considered valid.

The registrant argues that although the method is nonspecific, the aerobic metabolism data provided previously should suffice in describing the degradation pathway of fenoxaprop ethyl. In that study (Gildemeister et al., 1982, Acc. No. 071800), fenoxaprop ethyl degraded with a half-life of <1 day, producing 2-[4-(6-chloro-2-benzoxazolyloxy)-phenol]propionic acid (up to 58% of the applied), 6-chloro-2,3-dihydrobenzoxazol-2-one (up to 11.6% of the applied), and 4-(6-chloro-2-benzoxazolyloxy)phenol (up to 2.3% of the applied). Also, in a new study provided by the registrant (Study 5) using [<sup>14</sup>C]fenoxaprop ethyl on field microplots, <18% of the recovered radioactivity was fenoxaprop ethyl at 3 hours posttreatment; 2-[4-(6-chloro-2-benzoxazolyloxy)phenol]-propionic acid was the major extractable degradate at all sampling intervals. In the Maryland study in field plots treated at the maximum use rate (0.2 lb ai/A), residues (parent plus three degradates) are <0.08 ppm at all sampling intervals and <0.02 ppm by 30 days posttreatment. So long as the treatment rate remains low, it is unlikely that any useful information would be provided if the study were repeated using a specific method.

The registrant has provided the pH (6.4) and CEC (5.1 meq/100 g) of the soil. Field test data have been supplied by the registrant; however, the data are dated 1985 and the study was conducted in 1984, so it cannot be determined whether atypical meteorological conditions existed during the study. Although other pesticides were applied to the test plot, none were tank mixed with fenoxaprop ethyl; the application of more than one pesticide would not in and of itself cause a study to be rejected.

In conclusion, the study is scientifically valid and partially fulfills data requirements by providing data on the field dissipation of fenoxaprop ethyl. Although the analytical method was nonspecific and complete meteorological data were not given, EAB can accept the study because of the relatively rapid degradation rate of parent compound and the low residues found even at exaggerated application rates of 7.5x.

Table 1. Fenoxaprop ethyl residues (ppm) in the 0- to 3-inch depth of replicate loam soil field plots in Maryland treated with fenoxaprop ethyl (1 lb/gal EC) at 0.2 and 1.0 lb ai/A.

| Sampling interval (days) | 0.2 lb ai/A     |      |      | 1.0 lb ai/A |      |      |
|--------------------------|-----------------|------|------|-------------|------|------|
|                          | I               | II   | III  | I           | II   | III  |
| Pretreatment             | ND <sup>a</sup> | --   | --   | ND          | --   | --   |
| 0                        | 0.08            | --   | --   | 0.53        | 0.22 | 0.28 |
| 4                        | 0.07            | 0.07 | 0.04 | 0.74        | 0.20 | 0.24 |
| 8                        | 0.05            | 0.02 | 0.02 | 0.21        | 0.33 | ND   |
| 14                       | ND              | 0.02 | ND   | 0.10        | 0.08 | 0.14 |
| 30                       | --              | --   | --   | 0.05        | 0.03 | 0.03 |
| 60                       | --              | --   | --   | ND          | 0.02 | ND   |
| 91                       | --              | --   | --   | ND          | ND   | ND   |

<sup>a</sup> Not detected; the detection limit was 0.02 ppm.

CASE GS -- FENOXAPROP ETHYL STUDY 7 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC)  
-----FICHE/MASTER ID No MRID CONTENT CAT 01  
Johnson, J. and W. Horton. 1985. Analysis of HOE 33171 in soil from Fishers,  
IN. Hoechst Report No. A31375. Prepared and submitted by American Hoechst  
Corporation, Somerville, NJ. Acc. No. 264056. Reference J-9.  
-----SUBST. CLASS = S.  
-----DIRECT RVW TIME = 2 (MH) START-DATE END DATE  
-----REVIEWED BY: K. Patten  
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-----

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DATE:

CONCLUSIONS:Field Dissipation - Terrestrial

Fenoxaprop ethyl residues dissipated with a half-life of 14-30 days in the 0- to 3-inch depth of clay soil located in Indiana that was treated with fenoxaprop ethyl (1 lb/gal EC) at 1 lb ai/A (Table 1). In the soil treated at 0.2 lb ai/A, fenoxaprop ethyl residues were <0.06 ppm at all sampling intervals. Fenoxaprop ethyl residues were <0.03 ppm in the 3- to 6- and 6- to 12-inch depths of both treatments at all sampling intervals.

In the previous review of this study (Dynamac, 1/7/86), it was concluded that this study was scientifically invalid because the analytical method was inadequate (recoveries from fortified samples ranged from 65 to 125%) to accurately assess the dissipation of fenoxaprop ethyl from soil. In addition, this study would not fulfill data requirements because the method was nonspecific, the patterns of decline of fenoxaprop ethyl and formation and decline of its degradates were not addressed, the soil pH and CEC were not reported, the glyphosate (a second pesticide applied to the soil) was not characterized, field test data were incomplete, and more than one pesticide was applied to the soil which may have

affected the dissipation rate of fenoxaprop ethyl. Meteorological data, including soil and air temperatures and rainfall amounts were provided but were illegible.

Refer to Study 6 of this document for a discussion of the registrants' response to criticism of the analytical method. The registrant has provided the pH (4.9-5.2) and CEC (12.6-13.7 meq/100 g) of the soil. Air temperatures ranged from 45 to 94°F, and soil temperatures (4-inch depth, bare soil) ranged from 56 to 96°F during the study. As noted in Study 6, the application of more than one pesticide to the soil would not in itself cause a study to be rejected.

In conclusion, this study is scientifically valid and partially fulfills data requirements by providing information on the field dissipation of fenoxaprop ethyl. Although the analytical method is nonspecific, we can accept this study because of the rapid degradation rate of the parent compound and the relatively low level of residues found even at exaggerated applications rates.

Table 1. Fenoxaprop ethyl residues (ppm) in the 0- to 3-inch depth of replicate clay soil plots in Indiana treated with fenoxaprop ethyl (1 lb/gal EC) at 0.2 and 1.0 lb ai/A.

| Sampling interval (days) | 0.2 lb ai/A     |      |      | 1 lb ai/A |      |      | Cumulative rainfall (inches) |
|--------------------------|-----------------|------|------|-----------|------|------|------------------------------|
|                          | I               | II   | III  | I         | II   | III  |                              |
| Pretreatment             | ND <sup>a</sup> | --   | --   | ND        | --   | --   | --                           |
| 0                        | 0.05            | ND   | 0.06 | 0.11      | 0.16 | 0.10 | --                           |
| 4                        | 0.04            | 0.02 | 0.04 | 0.07      | 0.07 | 0.22 | --                           |
| 7                        | 0.03            | ND   | 0.05 | 0.09      | 0.09 | 0.18 | --                           |
| 14                       | --              | --   | --   | 0.06      | 0.06 | 0.16 | 1.06                         |
| 30                       | --              | --   | --   | ND        | 0.03 | 0.04 | 1.95                         |
| 60                       | --              | --   | --   | ND        | ND   | 0.03 | 6.25                         |
| 90                       | --              | --   | --   | ND        | ND   | ND   | 9.76                         |

<sup>a</sup> Not detected; the detection limit was 0.02 ppm.

CASE GS -- FENOXAPROP ETHYL STUDY 8 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

-----  
FICHE/MASTER ID No MRID CONTENT CAT 01

Johnson, J. and W.E. Horton. 1986. Determination of combined fenoxaprop ethyl residues in irrigated turf, non-irrigated turf and soil samples from Pittstown, N.J. Unpublished study prepared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264057. Reference J-10.

-----  
SUBST. CLASS = S.-----  
DIRECT RVW TIME = 5 (MH) START-DATE END DATE-----  
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CONCLUSIONS:Field Dissipation - Terrestrial

1. This study is scientifically valid.
2. Fenoxaprop ethyl residues dissipated with a half-life of 7-28 days on irrigated and nonirrigated turf grass located in Pittstown, New Jersey, after fenoxaprop ethyl (purity 99%) was applied at 0.7 lb ai/A. Immediately posttreatment, residues on the irrigated turf were 7.7-30.6 ppm and declined to 0.9-1.1 ppm by 28 days, while residues on the nonirrigated turf were 13.4-19.6 ppm and declined to 1.4-2.6 ppm during the same interval. Residues were not detected (<0.05 ppm) in the soil (0- to 3-, 3- to 6-, and 6- to 12-inch depths) at any sampling interval.
3. This study does not fulfill EPA Data Requirements for Registering Pesticides because the analytical method was nonspecific and the test substance was not a typical end-use product.

## MATERIALS AND METHODS:

Fenoxaprop ethyl (purity 99%) was applied at 0.7 lb ai/A to two plots (each 6 x 45 feet) of established (7-year old, 2 inches high) perennial ryegrass-Kentucky bluegrass growing on silt loam soil (10% sand, 70% silt, 20% clay, 2.5% organic matter, pH 5.7) located in Pittstown, New Jersey, on July 13, 1985. One plot was irrigated with ~0.5 inches of water at 1 hour and at 6, 14, 22, and 27 days posttreatment; the second plot was not irrigated. A third, untreated plot (6 x 45 feet) served as a control. Turf/thatch and soil (0- to 3-, 3- to 6-, and 6- to 12-inch depths) samples were taken on days 0, 3, 7, 14 (soil only), and 28 post-treatment. Samples were frozen until analysis.

Turf and soil samples were analyzed for fenoxaprop ethyl residues using Hoechst Analytical Method Nos. AL 39/84 and AL 20/85 (Study 9; Acc. No. 264058). The extraction procedure cleaves fenoxaprop ethyl and its degradates, 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolyloxy)phenetole, and 4-(6-chloro-2-benzoxaxolyloxy)phenol, to 6-chloro-2,3-dihydrobenzoxazol-2-one. 6-Chloro-2,3-dihydrobenzoxazol-2-one is derivatized with acetic anhydride to form 3-acetyl-6-chloro-2,3-dihydrobenzoxazol-2-one which is quantified by GC with electron capture detection. Reported recoveries from soil samples fortified with fenoxaprop ethyl at 0.05 ppm ranged from 52 to 124% (mean  $80 \pm 22\%$ ), and recoveries from turf samples fortified at 0.05-30 ppm ranged from 50 to 93% (mean  $71 \pm 13\%$ ). The detection limit was 0.05 ppm.

## REPORTED RESULTS:

During the test period, total rainfall was 3.6 inches and high and low air temperature ranges were 78 to 90°F and 48 to 75°F, respectively.

Fenoxaprop ethyl residues dissipated with a half-life of 7-28 days on irrigated and nonirrigated turf (Table 1). Calculated half-lives of fenoxaprop ethyl residues on irrigated and nonirrigated turf were 8.6 and 9.3 days, respectively. Immediately posttreatment, residues on the irrigated turf were 7.7-30.6 ppm and declined to 0.9-1.1 ppm by 28 days posttreatment, while residues on the nonirrigated turf were 13.4-19.6 ppm and declined to 1.4-2.6 ppm during the same interval.

Residues were not detected (<0.05 ppm) in the soil (0- to 3-, 3- to 6-, and 6- to 12-inch depths) from the treated plots at any sampling interval. Residues were not detected on the turf or in the soil from the untreated control plot.

## DISCUSSION:

1. The analytical method was nonspecific; thus, residues on the turf were not adequately characterized.
2. The test substance was not a typical end-use product.
3. The CEC of the soil was not reported.

4. This study was designed to evaluate the dissipation of fenoxaprop ethyl when applied to turfgrass, and is not suitable to evaluate the dissipation of fenoxaprop ethyl for other uses because the sod prevents the herbicide from contacting the soil.
5. Results from triplicate samples of irrigated turfgrass (day 0 sampling interval) ranged from 7.7 to 30.6 ppm fenoxaprop ethyl residues. No explanation was provided for this wide variability. It was also not stated if irrigation occurred before or after the first posttreatment sample was taken; irrigation may have contributed to the data variability.

Table 1. Fenoxaprop ethyl residues (ppm) in/on turf (perennial ryegrass-Kentucky bluegrass) located in Pittstown, New Jersey, and treated with fenoxaprop ethyl (purity 99%) at 0.7 lb ai/A.

| Sampling interval (days) | Date    | Rep 1 | Rep 2 | Rep 3 | Cumulative precipitation (inches) |
|--------------------------|---------|-------|-------|-------|-----------------------------------|
| <u>Irrigated</u>         |         |       |       |       |                                   |
| 0                        | 7/13/85 | 10.9  | 30.6  | 7.7   | 0.50                              |
| 3                        | 7/16/85 | 4.0   | 2.7   | 4.2   | 1.05                              |
| 7                        | 7/20/85 | 3.6   | 0.9   | 4.3   | 1.55                              |
| 28                       | 8/10/85 | 1.1   | 0.8   | 0.9   | 6.30                              |
| <u>Nonirrigated</u>      |         |       |       |       |                                   |
| 0                        | 7/13/85 | 13.4  | 18.7  | 19.6  | --                                |
| 3                        | 7/16/85 | 11.5  | 6.9   | 8.4   | 0.55                              |
| 7                        | 7/20/85 | 11.9  | 14.4  | 11.6  | 0.55                              |
| 28                       | 8/10/85 | 2.6   | 1.4   | 1.7   | 3.60                              |

<sup>a</sup> Fenoxaprop ethyl residues include fenoxaprop ethyl, 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolyloxy)-phenetole, 4-(6-chloro-2-benzoxazolyloxy)phenol, and 6-chloro-2,3-dihydrobenzoxazol-2-one.

CASE GS -- FENOXAPROP ETHYL STUDY 9 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC)  
-----FICHE/MASTER ID No MRID CONTENT CAT 01  
Horton, W.E. 1986a. Aquatic field dissipation of fenoxaprop-ethyl and its  
metabolite residues at Greenville, Mississippi. AHC Field Trial Number:  
EH-85-USAK-20R; HRAV Experiment Number 86-MS-85-039. Unpublished study pre-  
pared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by  
American Hoechst Corporation, Somerville, NJ. Acc. No. 264058. Reference  
J-11.  
-----SUBST. CLASS = S.  
-----DIRECT RVW TIME = 12 (MH) START-DATE END DATE  
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CONCLUSIONS:Field Dissipation - Aquatic and Aquatic Impact

1. This study is scientifically valid.
2. Fenoxaprop ethyl residues dissipated with a half-life of <4 days in the 0- to 3-inch depth of silty clay soil in rice plots after fenoxaprop ethyl (1.0 lb/gal EC) was applied at 1.5 lb ai/A and prior to flooding. Immediately after flooding (1-4 days posttreatment), residues in the sediment (0- to 3-inch depth) were 0.08-0.23 ppm, and residues in the water were <0.01-0.06 ppm. Residues declined to <0.05 and <0.01 ppm, respectively, by 14 days posttreatment. Residues were not detected (<0.05 ppm) in the 3- to 6- and 6- to 12-inch soil/sediment depths at any sampling interval.
3. This study partially fulfills EPA Data Requirements for Registering Pesticides by providing data on the dissipation of fenoxaprop ethyl in rice fields. Although the analytical method used was nonspecific, the data

are acceptable because of the rapid degradation of the parent compound and the relatively low level of residues found even at the exaggerated application used 7.5x.

#### MATERIALS AND METHODS:

Fenoxaprop ethyl (Whip, 1.0 lb/gal EC, source unspecified) was applied at 1.5 lb ai/A to six rice plots (17 x 19 feet) containing silty clay soil (1.2% sand, 48.4% silt, 50.4% clay, 2% organic matter, pH 6.3) located in Leland, Mississippi, on August 5, 1985. The plots were moistened prior to the application. At 1 day posttreatment, three of the six plots were flooded with water to a depth of 4 inches, and at 4 days posttreatment the remaining three plots were flooded. The 4-inch water depth was maintained throughout the study, and the water used to flood the plots was analyzed twice during the study (Table 1). No crops were grown in the plots, and no other weed control was used. Soil/sediment samples (0- to 3-, 3- to 6-, and 6- to 12-inch depths) were taken before treatment, immediately after treatment, and up to 91 days posttreatment. Water samples were taken from the plots from day 1 or 4 posttreatment (day plots flooded) to day 91. Samples were frozen (-20°C) until analysis. Samples were stored ~4-8 months prior to analysis.

Water and homogenized soil/sediment samples were refluxed or Soxhlet-extracted for 8 hours with water:hydrochloric acid:ethanol (7:1:2). During the extraction procedure, fenoxaprop ethyl and its degradates, 2-[4-(6-chloro-2-benzoxazolylloxy)phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolylloxy)phenetole, and 4-(6-chloro-2-benzoxazolylloxy)phenol, were cleaved to form 6-chloro-2,3-dihydrobenzoxazol-2-one. The extract was filtered, applied to a SEP-PAK C-18 column, and eluted with ethyl acetate through a SEP-PAK silica gel column (attached downstream to the C-18 column). The eluate was evaporated to dryness, and the residue was derivatized with acetic anhydride:pyridine (5:1) for 3 hours at 130°C. During the derivatization step, 6-chloro-2,3-dihydrobenzoxazol-2-one was converted to 3-acetyl-6-chloro-2,3-dihydrobenzoxazol-2-one. An emulsifier solution (1% Hoe S1728 in water) was added to the derivatized solution and applied to a SEP-PAK C-18 column. The C-18 column was eluted with n-hexane, and the eluate was applied to a silica gel column which was eluted with toluene. The toluene eluate was analyzed for 3-acetyl-6-chloro-2,3-dihydrobenzoxazol-2-one by GC with electron capture detection. Reported recoveries from soil samples fortified with fenoxaprop ethyl at 0.05-10.0 ppm ranged from 81 to 94% and from sediment samples fortified at 0.05-2.0 ppm ranged from 75 to 90%. Reported recoveries from water samples fortified with fenoxaprop ethyl at 0.01-0.20 ppm ranged from 72 to 93%. The detection limits were 0.05 and 0.01 0.01 ppm fenoxaprop ethyl equivalents in soil/sediment and water, respectively.

#### REPORTED RESULTS:

Rainfall during the test period was ~44 cm. High and low air temperature ranges were 12 to 36°C and 1 to 24°C, respectively. Relative humidity ranged from 20 to 100%.

Prior to flooding the rice plots, fenoxaprop ethyl residues dissipated with a half-life of <4 days in the 0- to 3-inch soil depth (Tables 2 and 3). Immediately after flooding at 1-4 days posttreatment, fenoxaprop ethyl residues in the sediment (0- to 3-inch depth) and water were 0.08-0.23 ppm and <0.01-0.06 ppm, respectively. Residues were not detectable (<0.05 and <0.01 ppm, in the sediment and water, respectively) at 14 days posttreatment. Residues were not detected (<0.05 ppm) in the 3- to 6- and 6- to 12-inch soil/sediment depths at any sampling interval.

#### DISCUSSION:

1. The analytical method was nonspecific; therefore, residues in the soil, sediment, and water were not adequately characterized.
2. The Dundee silty clay loam soil was misclassified in the study. The soil was determined to be a silty clay soil according to the USDA Textural Classification System and is described as such in this report.
3. The CEC of the soil was not reported.

Table 1. Characteristics of the water used to flood the rice plots.<sup>a</sup>

| Month sampled | Temperature (°C) | pH      | Dissolved oxygen content <sup>b</sup> | Total suspended solids (mg/l) |
|---------------|------------------|---------|---------------------------------------|-------------------------------|
| October       | 23               | 7.3-8.4 | 7.2-9.8                               | 15-104                        |
| November      | 18               | 7.9-8.5 | 8.3-8.6                               | 4-36                          |

<sup>a</sup> Results are analysis of six samples at each sampling interval.

<sup>b</sup> Units not specified.

Table 2. Fenoxaprop ethyl residues (ppm) in silty clay soil<sup>a</sup> and water from rice plots in Leland, Mississippi, treated with fenoxaprop ethyl (1.0 lb/gal EC) at 1.5 lb ai/A and flooded at 1 day posttreatment.<sup>bc</sup>

| Sampling interval<br>(days) | Date    | Soil/sediment sampling depth (inches) <sup>d</sup> |     |      | Water |
|-----------------------------|---------|--|-----|------|-------|
|                             |         | 0-3  | 3-6 | 6-12 |       |
| 0 (pretreatment)            | 8/5/85  | ND <sup>e</sup>                                    | ND  | ND   | --    |
| 0 (posttreatment)           | 8/5/85  | 0.57   | ND  | ND   | --    |
| 1 (preflood)                | 8/6/85  | 0.29   | ND  | ND   | --    |
| 1 (postflood)               | 8/6/85  | 0.23   | ND  | ND   | 0.06  |
| 3                           | 8/8/85  | 0.05   | ND  | ND   | 0.01  |
| 7                           | 8/12/85 | 0.02 <sup>f</sup>                                  | ND  | ND   | ND    |
| 14                          | 8/19/85 | ND   | ND  | ND   | ND    |
| 21                          | 8/26/85 | ND   | ND  | ND   | ND    |
| 28                          | 9/2/85  | ND   | ND  | ND   | ND    |
| 60                          | 10/4/85 | ND   | ND  | ND   | ND    |
| 91                          | 11/9/85 | ND   | ND  | ND   | ND    |

<sup>a</sup> Classified as Dundee silty clay loam soil in the study.

<sup>b</sup> Fenoxaprop ethyl residues include fenoxaprop ethyl, 2-[4-(6-chloro-2-benzoxazolyloxy)-phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolyloxy)phenetole, 4-(6-chloro-2-benzoxazolyloxy)phenol, and 6-chloro-2,3-dihydrobenzoxazol-2-one.

<sup>c</sup> Results represent mean of triplicate samples.

<sup>d</sup> Samples were characterized as soil prior to flooding the plots and sediment after flooding.

<sup>e</sup> Not detected; the detection limits were 0.05 and 0.01 ppm in soil/sediment and water, respectively.

<sup>f</sup> One sample contained 0.06 ppm residues and two samples contained residues <0.05 ppm.

Table 3. Fenoxaprop ethyl residues (ppm) in silty clay soil<sup>a</sup> and water from rice plots in Leland, Mississippi, treated with fenoxaprop-ethyl (1.0 lb ai/gal EC) at 1.5 lb ai/A and flooded at 4 days posttreatment.<sup>bc</sup>

| Sampling interval<br>(days) | Date    | Soil/sediment sampling depth (inches) <sup>d</sup> |     |      | Water |
|-----------------------------|---------|--|-----|------|-------|
|                             |         | 0-3  | 3-6 | 6-12 |       |
| 0 (pretreatment)            | 8/5/85  | NDE  | ND  | ND   | --    |
| 0 (posttreatment)           | 8/5/85  | 0.80   | ND  | ND   | --    |
| 4 (preflood)                | 8/9/85  | 0.36   | ND  | ND   | --    |
| 4 (postflood)               | 8/9/85  | 0.08   | ND  | ND   | ND    |
| 7                           | 8/12/85 | 0.05 <sup>f</sup>                                  | ND  | ND   | ND    |
| 14                          | 8/19/85 | ND   | ND  | ND   | ND    |
| 21                          | 8/26/85 | ND   | ND  | ND   | ND    |
| 28                          | 9/2/85  | ND   | ND  | ND   | ND    |
| 60                          | 10/4/85 | ND   | ND  | ND   | ND    |
| 91                          | 11/9/85 | ND   | ND  | ND   | ND    |

<sup>a</sup> Classified as Dundee silty clay loam soil in the study.

<sup>b</sup> Fenoxaprop ethyl residues include fenoxaprop ethyl, 2-[4-(6-chloro-2-benzoxazolyloxy)-phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolyloxy)phenetole, 4-(6-chloro-2-benzoxazolyloxy)phenol, and 6-chloro-2,3-dihydrobenzoxazol-2-one.

<sup>c</sup> Results represent mean of triplicate samples.

<sup>d</sup> Samples were characterized as soil prior to flooding the plots and sediment after flooding.

<sup>e</sup> Not detected; the detection limits were 0.05 and 0.01 ppm in soil/sediment and water, respectively.

<sup>f</sup> One sample contained 0.15 ppm residues and two samples contained residues <0.05 ppm.

CASE GS -- FENOXAPROP ETHYL STUDY 10 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAR DISC --

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC)

-----  
FICHE/MASTER ID No MRID CONTENT CAT 01  
Horton, W.E. 1986c. Aquatic field dissipation and irrigated crop accumula-  
tion potentiation of fenoxaprop-ethyl and its metabolite residues at New Iberia,  
Louisiana. Unpublished study prepared by Hoechst-Roussel AgriVet Company,  
Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ.  
Acc. Nos. 264059 and 264060. Reference J-12.  
-----

SUBST. CLASS = S.

-----  
DIRECT RVW TIME = 10 (MH) START-DATE END DATE  
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-----

SIGNATURE:

DATE:

CONCLUSIONS:Field Dissipation - Aquatic and Aquatic Impact

1. This portion of the study is scientifically valid.
2. Fenoxaprop ethyl residues dissipated with a half-life of <7 days in the 0- to 7.5-cm depth of silt loam soil after fenoxaprop ethyl (1.0 lb/gal EC) was applied at 0.2 and 1.0 lb ai/A and the soil flooded at 3 days posttreatment. At 28 days posttreatment, residues were not detected (<0.05 ppm) in the 0- to 7.5-cm soil depth. Residues were not detected in the lower soil depths (7.5-15 and 15-30 cm) at any sampling interval. Residues were not detected (<0.02 ppm) in the flood water from the 0.2 lb ai/A treated plot; in the water from the 1.0 lb ai/A treated plot, residues were detected (0.03 ppm) only at 7 days posttreatment.
3. This portion of the study partially fulfills EPA Data Requirements for Registering Pesticides by providing data on the dissipation of fenoxaprop ethyl in rice fields. Although the analytical method used was nonspecific, we can accept the data because of the rapid degradation

rate of the parent compound and the relatively low level of residues found at the exaggerated application rate used 7.5x.

#### Field Accumulation - Irrigated Crops

1. This portion of the study is scientifically valid.
2. Fenoxaprop ethyl residues were not detected in mustard (<0.05 ppm), carrot roots (<0.05 ppm), wheat forage (<0.05 ppm), wheat straw or grain (<0.25 ppm), or in soil (0- to 7.5-, 7.5- to 15-, and 15- to 30-cm depths) irrigated with flood water from plots of silt loam soil treated with fenoxaprop ethyl (1.0 lb/gal EC) at 0.2 and 1.0 lb ai/A and flooded at 3 days posttreatment. Fenoxaprop ethyl residues were <0.03 ppm in the irrigation water at any sampling interval.
3. This portion of the study fulfills EPA Data Requirements for Registering Pesticides by providing information on the accumulation of fenoxaprop ethyl residues in crops irrigated at 4 days posttreatment with flood water from a plot of silt loam soil that was treated then flooded at 3 days posttreatment.

#### MATERIALS AND METHODS:

Fenoxaprop ethyl (Whip, 1.0 lb/gal EC, source unspecified) was applied at 0.2 and 1.0 lb ai/A to plots (0.92 x 1.37 meters) of silt loam soil (13.2% sand, 70.3% silt, 16.5% clay, 2.6% organic matter, pH 5.23, CEC 14.9 meq/100 g) located in New Iberia, Louisiana, on August 26, 1985. An untreated plot (same dimensions as treated plots) served as a control. No crops were grown in these primary plots and no other weed control was used. At 3 days posttreatment, the primary plots were flooded with water to a depth of 10 cm. The 10-cm water depth was maintained throughout the study. At 4 days prior to treatment (August 22, 1985), adjacent untreated plots (0.92 x 2.74 meters; Figure 1) of silt loam soil were planted to mustard, carrots, and wheat. These adjacent secondary plots were irrigated periodically from 4 to 228 days posttreatment with water from the primary plots. The primary and secondary plots were covered with a clear plastic roof to prevent rainfall from affecting the study. Soil samples (0- to 7.5-, 7.5- to 15-, and 15- to 30-cm depths) were taken from the primary plots immediately posttreatment and at 3, 7, 14, 28, 60, 90, and 120 days posttreatment. Irrigation water and soil (same increments as above) from the secondary plots were sampled at 4, 7, 14, 28, 90, 120, and 228 days posttreatment. Irrigated mustard was sampled at 28, 60, and 90 days posttreatment. Carrot roots were sampled at 120 days posttreatment. Wheat forage was sampled at 28, 60, 90, and 120 days, while grain and straw were sampled at 228 days posttreatment. Samples were frozen until analysis.

Water and homogenized soil and plant samples were analyzed for fenoxaprop ethyl residues using Hoechst Analytical Method Nos. AL 39/84 and AL 20/85 (Study 9; Acc. No. 264058). The extraction procedure cleaves fenoxaprop ethyl and its degradates, 2-[4-(6-chloro-2-benzoxazolyl)oxy]phenoxy)propionic acid, 4-(6-chloro-2-benzoxazolyl)phenetole, and 4-(6-chloro-2-benzoxazolyl)phenol, to 6-chloro-2,3-dihydrobenzoxazol-2-one. 6-

Chloro-2,3-dihydrobenzoxazol-2-one is derivatized with acetic anhydride to form 3-acetyl-6-chloro-2,3-dihydrobenzoxazol-2-one which is quantified by GC with electron capture detection. Reported recoveries from various substrates fortified with fenoxaprop ethyl and limits of detection are presented in Table 1.

#### REPORTED RESULTS:

From the day of herbicide application to 120 days posttreatment (final soil sampling interval from primary plot), rainfall was 71.36 cm, high and low air temperature ranges were 11 to 38°C and -1.5 to 29°C, respectively, and the relative humidity ranged from 34 to 98%. During the remainder of the test period (up to 228 days posttreatment), rainfall was 32.15 cm, high and low air temperature ranges were 5.5 to 40°C and -3 to 20°C, respectively, and the relative humidity ranged from 33 to 90%.

At both treatment rates, fenoxaprop ethyl residues dissipated with a half-life of <7 days in the 0- to 7.5-cm soil depth (Table 2). Immediately posttreatment, residues in the 0- to 7.5-cm soil depth were 0.15 and 1.13 ppm at the 0.2 and 1.0 lb ai/A treatment rates, respectively, and declined to <0.05 ppm by 28 days posttreatment. Residues were not detected (<0.05 ppm) in the lower soil depths (7.5-15 and 15-30 cm) at any sampling interval. Residues were not detected (<0.02 ppm) in the irrigation water from the 0.2 lb ai/A treated plot, while in the water from the 1.0 lb ai/A treated plot, residues were detected (0.03 ppm) only at 7 days posttreatment.

Fenoxaprop ethyl residues were not detected in the irrigated soil (<0.05 ppm) from the secondary plots or in the crops (mustard, <0.05 ppm; carrot roots, <0.05 ppm; wheat forage, <0.05 ppm; wheat straw and grain, <0.25 ppm) at any sampling interval.

Residues were not detected in the soil from the untreated primary plot, irrigation water, irrigated soil, or crops.

#### DISCUSSION:

##### Field Dissipation - Aquatic and Aquatic Impact

1. The analytical method was nonspecific; thus, residues in the soil and water were not adequately characterized.
2. Although it was stated that the irrigation water was characterized (pH, dissolved oxygen), the results were not provided.

##### Field Accumulation - Irrigated Crops

The analytical method was nonspecific for fenoxaprop ethyl and its degradates; however, since significant residues were not detected in the irrigation water, irrigated soil, and crops, the results would not be affected by a more specific method.



Table 1. Reported recoveries from various substrates fortified with fenoxaprop ethyl, and limits of detection.

| Substrate    | Fortification level (ppm) | Range of recoveries (%) | Average recovery (%) | Detection limit (ppm) |
|--------------|---------------------------|-------------------------|----------------------|-----------------------|
| Soil         | 0.05-2.0                  | 60-136                  | 72 ± 16              | 0.05                  |
| Water        | 0.02-0.50                 | 60-100                  | 76 ± 16              | 0.02                  |
| Mustard      | 0.05-0.10                 | 66-82                   | 74 ± 8               | 0.05                  |
| Carrot roots | 0.05                      | 82                      | 82                   | 0.05                  |
| Wheat        |                           |                         |                      |                       |
| Forage       | 0.05-0.10                 | 62-88                   | 77 ± 13              | 0.05                  |
| Grain        | 0.25                      | 56-61                   | 59 ± 4               | 0.25                  |

Table 2. Fenoxaprop ethyl residues (ppm) in silt loam soil (primary plots) and water in New Iberia, Louisiana, treated with fenoxaprop ethyl (1.0 lb/gal EC) at 0.2 and 1.0 lb ai/A and flooded at 3 days posttreatment.<sup>a</sup>

| Sampling interval (days) | Date     | 0.2 lb ai/A treatment rate |        |       |                               | 1.0 lb ai/A treatment rate |        |       |                               |
|--------------------------|----------|----------------------------|--------|-------|-------------------------------|----------------------------|--------|-------|-------------------------------|
|                          |          | Sampling depth (cm)        |        |       | Irrigation water <sup>b</sup> | Sampling depth (cm)        |        |       | Irrigation water <sup>b</sup> |
|                          |          | 0-7.5                      | 7.5-15 | 15-30 |                               | 0-7.5                      | 7.5-15 | 15-30 |                               |
| 0                        | 8/26/85  | 0.15                       | NDC    | --    | --                            | 1.13                       | ND     | --    | --                            |
| 3 <sup>d</sup>           | 8/29/85  | 0.09                       | ND     | --    | --                            | 0.32                       | ND     | --    | --                            |
| 4                        | 8/30/85  | --                         | --     | --    | ND                            | --                         | --     | --    | ND                            |
| 7                        | 9/02/85  | 0.06                       | ND     | ND    | ND                            | 0.16                       | ND     | ND    | 0.03                          |
| 14                       | 9/09/85  | 0.03                       | ND     | ND    | ND                            | 0.24                       | ND     | ND    | ND                            |
| 28                       | 9/23/85  | ND                         | ND     | ND    | ND                            | ND                         | ND     | ND    | ND                            |
| 60                       | 10/25/85 | ND                         | ND     | ND    | ND                            | ND                         | ND     | ND    | ND                            |
| 90                       | 11/24/85 | ND                         | ND     | ND    | ND                            | ND                         | ND     | ND    | ND                            |
| 120                      | 12/24/85 | ND                         | ND     | ND    | ND                            | ND                         | ND     | ND    | ND                            |
| 228                      | 4/11/86  | --                         | --     | --    | ND                            | --                         | --     | --    | ND                            |

<sup>a</sup> Fenoxaprop ethyl residues include fenoxaprop ethyl, 2-[4-(6-chloro-2-benzoxazolyl-oxy)-phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolyl-oxy)phenetole, 4-(6-chloro-2-benzoxazolyl-oxy)phenol, and 6-chloro-2,3-dihydrobenzoxazol-2-one.

<sup>b</sup> Water from primary plots used to irrigate secondary plots and crops.

<sup>c</sup> Not detected; detection limits were 0.05 and 0.02 ppm in soil and water, respectively.

<sup>d</sup> Soil sampled immediately prior to flooding.

CASE GS -- FENOXAPROP ETHYL STUDY 11 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC)  
-----

FICHE/MASTER ID No MRID CONTENT CAT 01

Horton, W.E. 1986b. Aquatic field dissipation and irrigated crop accumulation potential of fenoxaprop-ethyl and its metabolite residues at Fresno, California. Unpublished study prepared and submitted by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264061. Reference J-13.

-----

SUBST. CLASS = S.  
-----DIRECT RVW TIME = 12 (MH) START-DATE END DATE  
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SIGNATURE:

DATE:

CONCLUSIONS:Field Dissipation - Aquatic and Aquatic Impact

1. This portion of the study is scientifically valid.
2. Fenoxaprop ethyl residues dissipated with an initial half-life of <11 days in the 0- to 5-cm depth of a sandy loam soil treated with fenoxaprop ethyl (1 lb/gal EC) at 0.2 lb ai/A. Immediately after a rice plot was treated, fenoxaprop ethyl residues were 0.14 ppm in the 0- to 5-cm soil depth. From day 11 (plot flooded on day 4) to day 69 posttreatment, residues were <0.05-0.07 ppm in the 0- to 5-cm soil depth. Residues were not detected (<0.05 ppm) in the lower soil depths (5-10 and 10-15 cm) at any sampling interval. In the flood water, maximum concentrations of fenoxaprop ethyl residues (0.03 ppm) were measured at 11 days posttreatment (7 days postflooding).
3. This portion of the study partially fulfills EPA Data Requirements for Registering Pesticides by providing data on the dissipation of fenoxaprop ethyl in rice fields. Although the analytical method used was

nonspecific, we can accept the data because of the rapid degradation of the parent compound and the low levels of residues found.

#### Field Accumulation - Irrigated Crops

1. This portion of the study is scientifically valid.
2. Fenoxaprop ethyl residues were not detected in carrot roots (<0.05 ppm), lettuce (<0.05 ppm), oat straw or grain (<0.25 ppm), or in soil (<0.05 ppm; 0- to 5-, 5- to 10-, and 10- to 15-cm depths) irrigated with water from a rice plot of sandy loam soil treated with fenoxaprop ethyl (1.0 lb/gal EC) at 0.2 lb ai/A and flooded at 4 days posttreatment. Fenoxaprop ethyl residues were not detected (<0.01 ppm) in the irrigation water at any sampling interval.
3. This portion of the study fulfills EPA Data Requirements for Registering Pesticides by providing information on the accumulation of fenoxaprop ethyl residues in crops irrigated at 11 days posttreatment with flood water from a rice plot of sandy loam soil that was treated then flooded at 4 days posttreatment.

#### MATERIALS AND METHODS:

Fenoxaprop ethyl (Whip, 1.0 lb/gal EC, source unspecified) was applied at 0.2 lb ai/A to a plot (30 x 36 feet) planted to rice (planting date unspecified) containing sandy loam soil (66% sand, 26% silt, 8% clay, 0.8% organic matter, pH 7.9, CEC 7.1 meq/100 g) located in Fresno, California, on November 15, 1985. An untreated plot (20 x 36 feet) served as a control. At 4 days posttreatment, the rice plots were flooded with water (depth unspecified). At 39 days prior to treatment (October 3, 1985), an adjacent untreated plot (18 x 64 feet; Figure 1) of sandy loam soil was planted to carrots, lettuce, and oats. This adjacent plot was irrigated at 11 days posttreatment and weekly for 4 weeks with water from the treated rice plot. An additional untreated plot (19 x 40 feet) was planted to carrots, lettuce, and oats and irrigated with water from the untreated rice plot. Soil/sediment samples (0- to 5-, 5- to 10-, and 10- to 15-cm depths) were taken from the rice plots before treatment, immediately after treatment, and at 11, 25, 39, and 69 days posttreatment. Soil samples (same increments as above) were taken from the irrigated plots before irrigation and up to 69 days posttreatment. Water from the rice plots and irrigation water (rice plot water taken from the sprinklers used to irrigate the crops) were sampled up to 39 days posttreatment. Irrigated crops were sampled at 11-69 days (lettuce), 161 days (carrot roots), and 193 days (oat grain and straw) posttreatment. Samples were frozen until analysis. Samples were analyzed ~1-7 months postsampling.

Water and homogenized soil/sediment and plant samples were analyzed for fenoxaprop ethyl residues using Hoechst Analytical method Nos. AL 39/84 and AL 20/85 (Study 9; Acc. No. 264058). The extraction procedure cleaves fenoxaprop ethyl and its degradates, 2-[4-(6-chloro-2-benzoxazolyl-oxo)-phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolyl-oxo)phenetole, and 4-(6-chloro-2-benzoxazolyl-oxo)phenol, to 6-chloro-2,3-dihydrobenzoxazol-2-one. 6-Chloro-2,3-dihydrobenzoxazol-2-one is derivatized with acetic

anhydride to form 3-acetyl-6-chloro-2,3-dihydrobenzoxazol-2-one which is quantified by GC with electron capture detection. Reported recoveries from various substrates fortified with fenoxaprop ethyl and limits of detection are presented in Table 1.

#### REPORTED RESULTS:

From the day of herbicide application through 69 days posttreatment (final soil/sediment sampling interval from the rice plot), rainfall was 3.33 inches and high and low air temperature ranges were 39 to 69°F and 29 to 58°F, respectively. During the remainder of the test period (up to 193 days posttreatment), rainfall was 9.07 inches and high and low air temperature ranges were 52 to 101°F and 33 to 67°F, respectively.

Immediately posttreatment in the rice plot, fenoxaprop ethyl residues were 0.14 ppm in the 0- to 5-cm soil depth (Table 2). From day 11 (plot flooded on day 4) to 69 posttreatment, residues were <0.07 ppm in the soil (0- to 5-cm depth). Residues were not detected (<0.05 ppm) in the lower soil depths (5-10 and 10-15 cm) at any sampling interval. In the flood water, maximum concentrations of fenoxaprop ethyl residues (0.03 ppm) were measured at 11 days posttreatment (7 days after flooding). Characteristics of the treated rice plot water were pH 7.9-8.8, dissolved oxygen 10-16.6 mg/l, and suspended soil 2-183 mg/l, and these values were comparable to untreated rice plot water.

Fenoxaprop ethyl residues were not detected in the water (<0.01 ppm) used to irrigate the crops, in the irrigated soil (<0.05 ppm, 0- to 5-, 5- to 10-, and 10- to 15-cm depths), or in the crops (carrot roots, <0.05 ppm; lettuce, <0.05 ppm; oat straw and grain, <0.25 ppm) at any sampling interval.

#### DISCUSSION:

##### Field Dissipation - Aquatic and Aquatic Impact

1. The analytical method was nonspecific; thus, residues in the soil/sediment and water were not adequately characterized.
2. Depth of the flood water was not reported.
3. The planting date of the rice was not reported. It was not stated at what stage the rice was at (if any) when the herbicide was applied.

##### Field Accumulation - Irrigated Crops

The analytical method was nonspecific for fenoxaprop ethyl and its degradates; however, since residues were not detected in the irrigation water, irrigated soil, or crops, the results would not be affected by a more specific method.

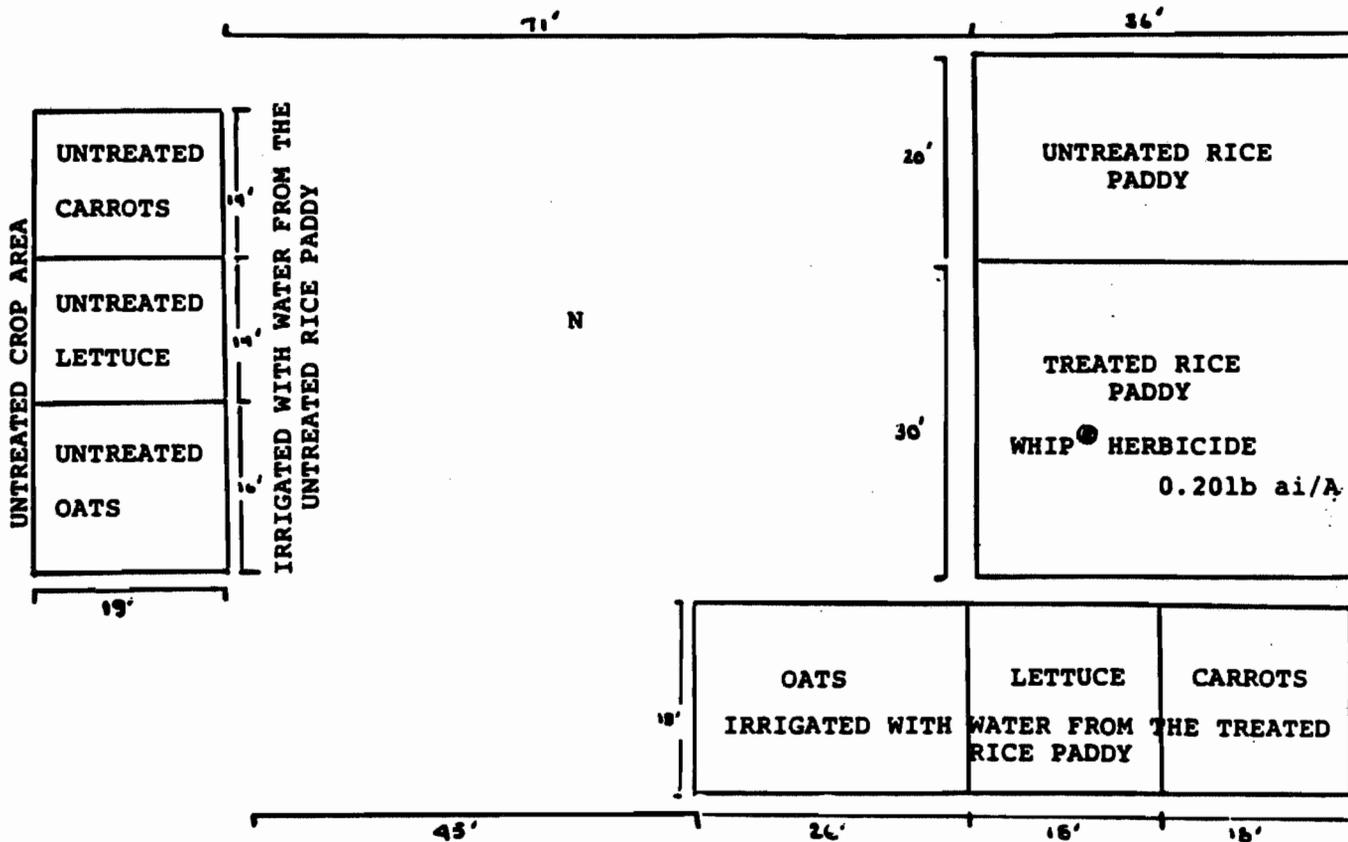


Figure 1. Field plot design.

Table 1. Reported recoveries from various substrates fortified with fenoxaprop ethyl and limits of detection.

| Substrate     | Fortification level (ppm) | Recovery (%) | Detection limit (ppm) |
|---------------|---------------------------|--------------|-----------------------|
| Soil/sediment | 0.05-0.50                 | 80-92        | 0.05                  |
|               | 1.00 <sup>a</sup>         | 53-68        |                       |
| Water         | 0.05-0.25                 | 85-88        | 0.01                  |
| Lettuce       | 0.05                      | 70           | 0.05                  |
|               | 1.00 <sup>a</sup>         | 61-139       |                       |
| Carrots       | 0.05-0.10                 | 68-72        | 0.05                  |
|               | 1.00 <sup>a</sup>         | 68           |                       |
| Oat grain     | 0.25-0.50                 | 67-82        | 0.25                  |
|               | 1.00 <sup>a</sup>         | 72           |                       |

<sup>a</sup> Untreated samples fortified in the field, whereas all other samples were fortified in the laboratory prior to extraction.

Table 2. Fenoxaprop ethyl residues (ppm) in sandy loam soil and water from a rice plot in Fresno, California, treated with fenoxaprop ethyl (1.0 lb/gal EC) at 0.2 lb ai/A and flooded at 4 days posttreatment.<sup>a</sup>

| Sampling interval<br>(days) | Date     | Soil/sediment sampling depth (cm) <sup>b</sup> |      |       | Water               |           |                         | Cumulative<br>precipitation<br>(inches) |
|-----------------------------|----------|--|------|-------|---------------------|-----------|-------------------------|---|
|                             |          | 0-5  | 5-10 | 10-15 | Source <sup>c</sup> | Rice plot | Irrigation <sup>d</sup> |   |
| 0 (pretreatment)            | 11/15/85 | ND <sup>e</sup>                                | ND   | ND    | --                  | --        | --                      | --                                      |
| 0 (posttreatment)           | 11/15/85 | 0.14   | ND   | ND    | --                  | --        | --                      | --                                      |
| 3                           | 11/18/85 | --   | --   | --    | ND                  | --        | --                      | --                                      |
| 4                           | 11/19/85 | --   | --   | --    | --                  | ND        | --                      | --                                      |
| 11                          | 11/26/85 | ND   | ND   | ND    | --                  | 0.03      | ND                      | 0.62                                    |
| 25                          | 12/10/85 | 0.05   | ND   | ND    | --                  | ND        | ND                      | 2.07                                    |
| 32                          | 12/17/85 | --   | --   | --    | --                  | --        | ND                      | 2.57                                    |
| 39                          | 12/24/85 | ND   | ND   | ND    | --                  | ND        | ND                      | 2.57                                    |
| 69                          | 01/23/86 | 0.07   | ND   | ND    | --                  | --        | --                      | 3.33                                    |

<sup>a</sup> Fenoxaprop ethyl residues include fenoxaprop ethyl, 2-[4-(6-chloro-2-benzoxazolyl oxy)phenoxy]propionic acid, 4-(6-chloro-2-benzoxazolyl oxy)phenetole, 4-(6-chloro-2-benzoxazolyl oxy)phenol, and 6-chloro-2,3-dihydrobenzoxazol-2-one.

<sup>b</sup> Samples were characterized as soil prior to flooding the rice plot and sediment after flooding.

<sup>c</sup> Water used to flood the rice plot.

<sup>d</sup> Rice plot water taken directly from the sprinkler heads used to irrigate the crops.

<sup>e</sup> Not detected; the detection limits were 0.05 and 0.01 ppm in soil/sediment and water, respectively.

CASE GS -- FENOXAPROP ETHYL STUDY 12 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAR DISC --

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC)  
-----FICHE/MASTER ID No MRID CONTENT CAT 01  
O'Grodnick, J. and J. Grande. 1984. Comparison of total extractable versus dislodgeable pesticide residues in turf grass after application of HOE 33171. Report No. A30857. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-15.  
-----SUBST. CLASS = S.  
-----DIRECT RVW TIME = 2 (MH) START-DATE END DATE  
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ORG: EAB/HED/OPP  
TEL: 557-7709  
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SIGNATURE:

DATE:

CONCLUSIONS:Reentry

In plots of perennial ryegrass sprayed with fenoxaprop ethyl (50 g/l EC) at 0.25 and 0.50 lb ai/A, dislodgeable fenoxaprop ethyl residues dissipated with a half-life of <3 hours (from ~11 to ~1.5 ppm in both treatments), while total extractable residues dissipated with a half-life of 1-3 days.

In the previous review of this study (Dynamac, 1/7/86), the major deficiency with this study was that the analytical method was nonspecific; the pattern of decline of fenoxaprop ethyl and pattern of formation and decline of fenoxaprop ethyl degradates were not addressed individually. In addition, air temperatures throughout the study were not provided.

Refer to Study 6 of this document for the discussion of the registrants' response to criticism of the analytical method. Air temperatures ranged from 61 to 86°F the day of application, and from 54 to 99°F during the 8-day study.

This study provides information on the dissipation of dislodgeable fenoxaprop ethyl residues from perennial ryegrass. However, re-entry data are not required for proposed uses on rice and soybeans.

CASE GS -- FENOXAPROP ETHYL STUDY 13 PM --

-----  
CHEM 128701 Fenoxaprop ethyl

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

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FICHE/MASTER ID No MRID CONTENT CAT 01  
Richards, S. and L. Wilkes. 1985. Storage stability study for HOE 33171 in  
soil (2 years). ADC Project No. 697-G. Prepared and submitted by American  
Hoechst Corporation, Somerville, NJ. Acc. No. 264061. Reference J-16.  
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SUBST. CLASS = S.

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DATE:

CONCLUSIONS:Ancillary Study - Freezer Storage Stability

The recovery of fenoxaprop ethyl residues from stored samples ranged from 72 to 149% of the applied with no discernable pattern.

In the previous review of this study (Dynamac, 1/7/86), it was concluded that this study was scientifically invalid because the analytical method was inadequate (it was nonspecific and recovery from fortified samples was too variable) to accurately assess the concentration of fenoxaprop ethyl in soil. Major deficiencies with the study were the test substance was not characterized, the soil was not characterized, and storage conditions were not defined.

Although the registrant has provided characterization of the test substance (purity >98%), characterization of the soil (clay loam; 26% sand, 44% silt, 30% clay, 3.2% organic matter, pH 4.8, CEC 31.6 meq/100 g), and a description of the storage conditions (30-g samples in screw-capped amber bottles at -20°C, moisture content not specified), the analytical methodology remains unacceptable for a stability study. The data are too variable to conclude that the stored pesticide is stable; with-

out residue characterization to show no degradates were formed, it cannot be determined whether the variable data are a result of the variable recovery or pesticide instability.

## EXECUTIVE SUMMARY

The data summarized here are scientifically valid data reviewed to date, but do not fulfill data requirements unless noted.

Chlorophenyl ring-labeled [ $^{14}\text{C}$ ]fenoxaprop ethyl (radiochemical purity >99.0%), at 0.88 ppm, degraded with a half-life of <8 hours in a sterile, aqueous citrate buffered solution constantly irradiated at  $1470 \text{ W/m}^2$  under a mercury vapor lamp at  $25 \pm 2^\circ\text{C}$ . Fifteen degradates were detected and two were identified: 6-chloro-2,3-dihydrobenzoxazol-2-one (8.1% of the applied after 8 hours of irradiation) and 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid (3.6% of the applied after 8 hours of irradiation). In the dark control, 80.8% of the applied [ $^{14}\text{C}$ ]fenoxaprop ethyl remained undegraded at 24 hours posttreatment.

Chlorophenyl ring-labeled [ $^{14}\text{C}$ ]fenoxaprop ethyl (radiochemical purity 99.0%), at 0.85 ppm, degraded with a calculated half-life of 183.4 hours in unbuffered distilled water (pH 7 at the start of the study) when irradiated with a mercury vapor lamp at  $25 \pm 2^\circ\text{C}$ . 2-[4-(6-Chloro-2-benzoxazolyloxy)phenoxy]propionic acid, 6-chloro-2,3-dihydrobenzoxazol-2-one, 4-(6-chloro-2-benzoxazolyloxy)phenol, and six other degradates were isolated; only 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid was >10% of the applied. In the dark control, 62.4% of the applied radioactivity was identified as parent 192 hours after treatment.

Chlorophenyl ring-labeled [ $^{14}\text{C}$ ]fenoxaprop ethyl (radiochemical purity 98%), degraded with a half-life of <4 hours on loamy sand soil samples irradiated with a mercury vapor lamp, an interval equivalent to <32 hours of natural sunlight. Degradation in the dark control occurred at approximately the same rate, with <4% of the applied fenoxaprop ethyl remaining undegraded in both irradiated and control samples at 45 hours (indicating that degradation was due to biotic and hydrolytic rather than photolytic reactions). The major degradate formed was 2-[4-(6-chloro-2-benzoxazolyloxy)phenoxy]propionic acid.

Fenoxaprop ethyl was slightly mobile in two loamy sand soils, two silt loam soils, and an aquatic sediment (clay). [ $^{14}\text{C}$ ]Fenoxaprop ethyl (radiochemical purity 95.6%), at 0.1-10.0  $\mu\text{g/ml}$ , was adsorbed with Freundlich Kads values ranging from 57.4 to 130; the slopes (n) of the adsorption isotherms were 0.81-1.00. Freundlich desorption coefficients ( $K_{\text{des}}$ ) ranged from 24.0 to 71.5.

Fenoxaprop ethyl residues dissipated with a half-life of 4-8 and 8-14 days in the 0- to 3-inch depth of loam soil located in Maryland that was treated with fenoxaprop ethyl (1 lb/gal EC) at 0.2 and 1.0 lb ai/A, respectively (Table 1). Fenoxaprop ethyl residues were not detected (<0.02 ppm) in the 3- to 6- and 6- to 12-inch depths of soil treated at 0.2 lb ai/A, and were <0.03 ppm in the soil treated at 1.0 lb ai/A at all sampling intervals.

Fenoxaprop ethyl residues dissipated with a half-life of 14-30 days in the 0- to 3-inch depth of clay soil located in Indiana that was treated with fenoxaprop ethyl (1 lb/gal EC) at 1 lb ai/A (Table 1). In the soil treated at 0.2 lb ai/A, fenoxaprop ethyl residues were <0.06 ppm at all sampling intervals. Fenoxaprop ethyl residues were <0.03 ppm in the 3- to 6- and 6- to 12-inch depths of both treatments at all sampling intervals.

Fenoxaprop ethyl residues dissipated with a half-life of 7-28 days on irrigated and nonirrigated turf grass located in Pittstown, New Jersey, after fenoxaprop ethyl (purity 99%) was applied at 0.7 lb ai/A. Immediately posttreatment, residues on the irrigated turf were 7.7-30.6 ppm and declined to 0.9-1.1 ppm by 28 days, while residues on the nonirrigated turf were 13.4-19.6 ppm and declined to 1.4-2.6 ppm during the same interval. Residues were not detected (<0.05 ppm) in the soil (0- to 3-, 3- to 6-, and 6- to 12-inch depths) at any sampling interval.

Fenoxaprop ethyl residues dissipated with a half-life of <4 days in the 0- to 3-inch depth of silty clay soil in rice plots after fenoxaprop ethyl (1.0 lb/gal EC) was applied at 1.5 lb ai/A and prior to flooding. Immediately after flooding (1-4 days posttreatment), residues in the sediment (0- to 3-inch depth) were 0.08-0.23 ppm, and residues in the water were <0.01-0.06 ppm. Residues declined to <0.05 and <0.01 ppm, respectively, by 14 days posttreatment. Residues were not detected (<0.05 ppm) in the 3- to 6- and 6- to 12-inch soil/sediment depths at any sampling interval.

Fenoxaprop ethyl residues dissipated with a half-life of <7 days in the 0- to 7.5-cm depth of silt loam soil after fenoxaprop ethyl (1.0 lb/gal EC) was applied at 0.2 and 1.0 lb ai/A and the soil flooded at 3 days posttreatment. At 28 days posttreatment, residues were not detected (<0.05 ppm) in the 0- to 7.5-cm soil depth. Residues were not detected in the lower soil depths (7.5-15 and 15-30 cm) at any sampling interval. Residues were not detected (<0.02 ppm) in the flood water from the 0.2 lb ai/A treated plot; in the water from the 1.0 lb ai/A treated plot, residues were detected (0.03 ppm) only at 7 days posttreatment.

Fenoxaprop ethyl residues dissipated with an initial half-life of <11 days in the 0- to 5-cm depth of a sandy loam soil treated with fenoxaprop ethyl (1 lb/gal EC) at 0.2 lb ai/A. Immediately after a rice plot was treated, fenoxaprop ethyl residues were 0.14 ppm in the 0- to 5-cm soil depth. From day 11 (plot flooded on day 4) to day 69 posttreatment, residues were <0.05-0.07 ppm in the 0- to 5-cm soil depth. Residues were not detected (<0.05 ppm) in the lower soil depths (5-10 and 10-15 cm) at any sampling interval. In the flood water, maximum concentrations of fenoxaprop ethyl residues (0.03 ppm) were measured at 11 days posttreatment (7 days postflooding).

Fenoxaprop ethyl residues were not detected in mustard (<0.05 ppm), carrot roots (<0.05 ppm), wheat forage (<0.05 ppm), wheat straw or grain (<0.25 ppm), or in soil (0- to 7.5-, 7.5- to 15-, and 15- to 30-cm depths) irrigated with flood water from plots of silt loam soil treated with fenoxaprop ethyl (1.0 lb/gal EC) at 0.2 and 1.0 lb ai/A and flooded at 3 days posttreatment. Fenoxaprop ethyl residues were <0.03 ppm in the irrigation water at any sampling interval.

Fenoxaprop ethyl residues were not detected in carrot roots (<0.05 ppm), lettuce (<0.05 ppm), oat straw or grain (<0.25 ppm), or in the soil (<0.05 ppm; 0- to 5-, 5- to 10-, and 10- to 15-cm depths) irrigated with water from a rice plot of sandy loam soil treated with fenoxaprop ethyl (1.0 lb/gal EC) at 0.2 lb ai/A and flooded at 4 days posttreatment. Fenoxaprop ethyl residues were not detected (<0.01 ppm) in the irrigation water at any sampling interval.

In plots of perennial ryegrass sprayed with fenoxaprop ethyl (50 g/l EC) at 0.25 and 0.50 lb ai/A, dislodgeable fenoxaprop ethyl residues dissipated with

a half-life of <3 hours (from ~11 to ~1.5 ppm in both treatments), while total extractable residues dissipated with a half-life of 1-3 days.

## RECOMMENDATIONS

Available data are insufficient to fully assess the environmental fate of, and the exposure of humans and nontarget organisms to fenoxaprop ethyl. The submission of data relative to full registration requirements (Subdivision N) on terrestrial food crop, aquatic food crop, terrestrial nonfood, and domestic outdoor use sites is summarized below:

Hydrolysis studies: No data were reviewed for this addendum. Based on previously submitted data (Asshauer, 1981, Acc. No. 071800), no additional data are required.

Photodegradation studies in water: Two studies were reviewed. The first study (Gildemeister et al., 1985, Acc. No. 264054) is scientifically valid, but does not fulfill data requirements because the distilled water was not buffered. The second study (Gildemeister et al., 1986, Acc. No. 264054) is scientifically valid, but does not fulfill data requirements because degradates comprising >10% of the applied were not identified. Differences in photodegradation rates between Studies 1 and 2 were not explained. All data are required.

Photodegradation studies in soil: One study (Gildemeister and Jordan, 1984, Acc. No. 264054) was reviewed and fulfills data requirements by providing information on the photodegradation of fenoxaprop ethyl on soil.

Photodegradation studies in air: No data were submitted; however, no data are required because of the low vapor pressure of fenoxaprop ethyl.

Aerobic soil metabolism studies: No data were reviewed for this addendum. Based on previously submitted data (Gildemeister et al., 1982, Acc. No. 071800), no additional data are required.

Anaerobic soil metabolism studies: No data were reviewed for this addendum. No data are required because a satisfactory anaerobic aquatic metabolism study has been provided.

Anaerobic aquatic metabolism studies: No data were reviewed for this addendum. Based on previously submitted data (Gildemeister and Schmidt, 1984, Acc. No. 073932), no additional data are required.

Aerobic aquatic metabolism studies: No data were reviewed for this addendum. Based on previously submitted data (Dorn et al., 1983, Acc. No. 073932), no additional data are required.

Leaching and adsorption/desorption studies: One study (Drury and Warren, 1986, Acc. No. 264054) was reviewed for this addendum and fulfills data requirements by providing information on the mobility (batch equilibrium) of unaged fenoxaprop ethyl in four soils and one aquatic sediment. The requirement for a study using aged fenoxaprop ethyl is not pertinent because at proposed use rates soil residues would be negligible after 30 days. No additional data are required.

Laboratory volatility studies: No data were submitted; however, no data are required because of the low vapor pressure of fenoxaprop ethyl.

Field volatility studies: No data were submitted; however, no data are required because of the low vapor pressure of fenoxaprop ethyl.

Terrestrial field dissipation studies: Four studies were reviewed. One study (Gildemeister, 1985, Acc. No. 264054) is scientifically invalid because <18% of the radioactivity recovered at the first sampling interval was the test substance, fenoxaprop ethyl. In addition, this study would not fulfill data requirements because the pesticide formulation was not specified, the test substance was applied in combination with another pesticide, data were reported as percent of recovered rather than percent of the applied, raw data were not provided, and the microplots were too small to be typical of actual use conditions. The second study (Johnson and Horton, 1985, Acc. No. 264057) is scientifically valid but does not fulfill data requirements because the analytical method was nonspecific and the test substance was not a typical end-use product. The third and fourth studies (Johnson and O'Grodnick, 1985, Acc. No. 264054 and 264055; Johnson and Horton, 1985, Acc. No. 264056) are scientifically valid and support the proposed use on soybeans at current use rates only. New uses at rates greater than 0.40 lb ai/A per season (total) must be supported by additional data using specific analytical methods.

Aquatic field dissipation studies: Three studies (Horton, 1986a, Acc. No. 264058; Horton, 1986c, Acc. Nos. 264059 and 264060; Horton, 1986b, Acc. No. 264061) were reviewed, are scientifically valid, and support the use on rice at proposed application rates only.

Forestry dissipation studies: No data were reviewed for this addendum; however, no data are required because fenoxaprop ethyl has no forestry use.

Dissipation studies for combination products and tank mix uses: No data were reviewed for this addendum; however, no data are required because data requirements for combination products and tank mix uses are currently not being imposed.

Long-term field dissipation studies: No data were reviewed for this addendum; however, no data are required because >50% of the applied fenoxaprop ethyl would be expected to dissipate before subsequent application.

Confined accumulation studies on rotational crops: No data were reviewed for this addendum. Based on previously reviewed data (Schwalbe-Fehl and Kocher, 1984, Acc. No. 073935; Borrison Laboratories, Inc., 1982, Acc. No. 071799), a 30-day rotational crop interval can be established for all crops except small grains (120-day interval).

Field accumulation studies on rotational crops: No data were reviewed for this addendum. Based on the results of the confined accumulation studies in rotational crops, no data are required.

Accumulation studies on irrigated crops: Two studies were reviewed. One study (Horton, 1986c, Acc. Nos. 264059 and 264060) fulfills data requirements by providing information on the accumulation of fenoxaprop ethyl residues in crops irrigated at 4 days posttreatment with flood water from a plot of silt

loam soil that was treated then flooded at 3 days posttreatment. The second study (Horton, 1986b, Acc. No. 264061) fulfills data requirements by providing information on the accumulation of fenoxaprop ethyl residues in crops irrigated at 11 days posttreatment with flood water from a rice plot of sandy loam soil that was treated then flooded at 4 days posttreatment. No additional data are required.

Laboratory studies of pesticide accumulation in fish: No data were reviewed for this addendum. Based on previously submitted data (McAllister and Franklin, 1984, Acc. No. 258980; Shaffer et al., 1985, Acc. No. 258981), no additional data are required at this time. Additional data may be required if catfish or crayfish are commercially cultivated in treated areas.

Field accumulation studies on aquatic nontarget organisms: No data were reviewed for this addendum. Data may be required if catfish or crayfish are commercially cultivated in treated areas.

Reentry studies: One study (O'Grodnick and Grande, 1984, Acc. No. 264061) was reviewed and is scientifically valid. No data are required.

Ancillary studies: One study (Richards and Wilkes, 1985, Acc. No. 264061) was reviewed and is scientifically invalid because the analytical method was inadequate (it was nonspecific and recovery from fortified samples was too variable) to accurately assess the concentration of fenoxaprop ethyl in soil.

#### LABEL RESTRICTIONS:

1. A 30-day rotational crop restriction is needed for all crops except small grains (120-day interval).
2. Do not use in areas where catfish and crayfish are commercially cultivated.
3. Do not use rice irrigation water to irrigate other crops within 14 days of application of fenoxaprop ethyl.

#### REFERENCES

- Drury, P. and J. Warren. 1986. Determination of adsorption/desorption constants of <sup>14</sup>C-HOE-33171. Report No. 34247. Prepared by Analytical Biochemistry Laboratories, Inc., Columbia, MO, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-4.
- Gildemeister, H. 1985. Field mobility and degradation studies. Report No. (B) 107/85. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-5.
- Gildemeister, H. and H.J. Jordan. 1984. HOE 033171-14C, photodegradation study on soil. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-3.

Gildemeister, H., C. Schink, and H. J. Jordan. 1986. Report on photodegradation in water. Report No. CB042/86. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-2.

Gildemeister, H. G. Schuld, and H. J. Jordan. 1985. HOE 033171-14C, photodegradation study in water. Prepared by Hoechst Aktiengesellschaft, Frankfurt am Main, West Germany, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-1.

Horton, W.E. 1986a. Aquatic field dissipation of fenoxaprop-ethyl and its metabolite residues at Greenville, Mississippi. AHC Field Trial Number: EH-85-USAK-20R; HRAV Experiment Number 86-MS-85-039. Unpublished study prepared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264058. Reference J-11.

Horton, W.E. 1986b. Aquatic field dissipation and irrigated crop accumulation potential of fenoxaprop-ethyl and its metabolite residues at Fresno, California. Unpublished study prepared and submitted by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264061. Reference J-13.

Horton, W.E. 1986c. Aquatic field dissipation and irrigated crop accumulation potential of fenoxaprop-ethyl and its metabolite residues at New Iberia, Louisiana. Unpublished study prepared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. Nos. 264059 and 264060. Reference J-12.

Johnson, J. and W. Horton. 1985. Analysis of HOE 33171 in soil from Fishers, IN. Hoechst Report No. A31375. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264056. Reference J-9.

Johnson, J. and W.E. Horton. 1986. Determination of combined fenoxaprop ethyl residues in irrigated turf, non-irrigated turf and soil samples from Pittstown, N.J. Unpublished study prepared by Hoechst-Roussel Agri-Vet Company, Somerville, NJ, and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264057. Reference J-10.

Johnson, J. and J. O'Grodnick. 1985. Analysis of HOE 33171 in soil from Princess Anne, MD. Hoechst Report No. A31374. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054 and 264055. References J-6 and J-8.

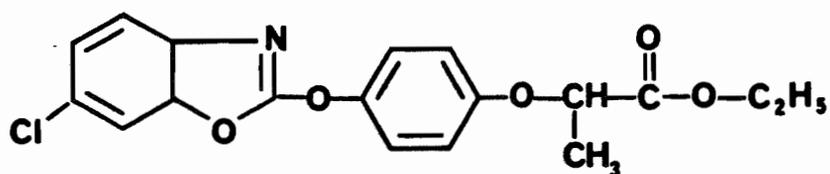
O'Grodnick, J. and J. Grande. 1984. Comparison of total extractable versus dislodgeable pesticide residues in turf grass after application of HOE 33171. Report No. A30857. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-15.

Richards, S. and L. Wilkes. 1985. Storage stability study for HOE 33171 in soil (2 years). ADC Project No. 697-G. Prepared and submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264061. Reference J-16.

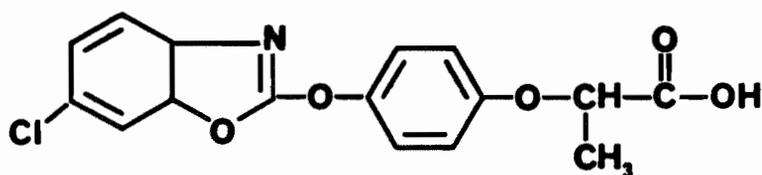
The following study was not reviewed because the test substance was carbaryl rather than fenoxaprop ethyl:

Caro, J.H., H.P. Freeman, and B.C. Turner. 1974. Persistence in soil and losses in runoff of soil-incorporated carbaryl in a small watershed. J. Agric. Food Chem. 22(5):860-863. Submitted by American Hoechst Corporation, Somerville, NJ. Acc. No. 264054. Reference J-7.

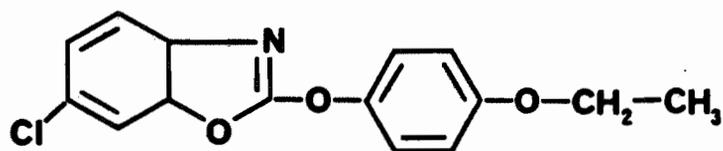
APPENDIX  
STRUCTURES OF REFERENCE COMPOUNDS



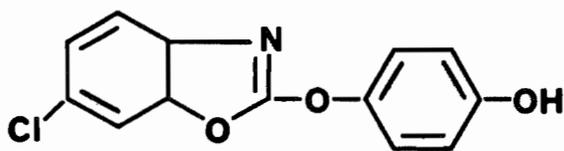
Ethyl-2-(4-(6-chloro-2-benzoxazolyl)oxy)propanoate  
(Fenoxprop ethyl)



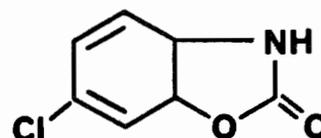
2-(4-(6-chloro-2-benzoxazolyl)oxy)propionic acid



4-(6-chloro-2-benzoxazolyl)phenetole



4-(6-chloro-2-benzoxazolyl)phenol



6-chloro-2,3-dihydrobenzoxazol-2-one