Date Out: EEB: SEP 21 1981

TO: Product Manager 21 Jacoby
TS-767

From: Dr. Willa Garner
Chief, Review Section No. 1
Environmental Fate Branch

Attached please find the enivronmental fate review of:

Reg./File No.: 100-607

Chemical: Metalaxyl

Type Product: Fungicide

Product Name: Ridomil

Company Name: Ciba-Geigy

Submission Purpose: groundwater monitoring data

ZBB Code: Other

Date in: 7/8/81

Date Completed SEP 21 1981

ACTION CODE: 571

EFB # 881

TAIS (level II)	Days
60	10

1.0 INTRODUCTION

1.1 Purpose

Ciba-Geigy is requesting review of the seventh ground water monitoring studies for metalaxyl 2E Fungicide (EFB #881, submitted on June 24, 1981). Metalaxyl, a soil-applied systemic fungicide, is currently registered under 3(c)(7) for use on tobacco (Reg. No. 100-607).

1.2 Previous Reviews

100-607	5/26/81
100-607	3/11/81
100-607	1/12/81

1.3 Background

Previous reviews of monitoring data have shown that metalaxyl residue in soils were relatively immobile and remained in the unsaturated zone profile; i.e., in the upper 3 feet layer of soil. No residues were detected in ground water in the test areas of Florida and Maryland. Accordingly, studies in Suwanee County, Florida were discontinued as of February, 1981.

Data reviewed in the sixth interim report, included the analytical results from samples collected at intervals until up to 219 days after application. This report (7th), contains the analytical results for samples collected from the Tobacco Experimental Farm near Upper Marlboro, Maryand; 287 days after application. In addition, data submitted included PESTAN leaching models for Florida and Maryland sites, and an environmental impact statement to support full label registration on turf.

1.4 Environmental Fate Profile

Data in our files show that metalaxyl is persistent to hydrolysis under normal environmental conditions of pH (5-9) and temperature (20-30°C). At pH 9-10, metalaxyl half-life varies from 5 hours to 5 days with a major degradation product, CGA-62826.

Under typical use conditions, less than 0.5% of the applied metalaxyl would be lost due to volatilization.

Metalaxyl is stable to soil surface photolysis under environmental conditions. However, photodegradation does occur in water with a half-life of 1 week. Degradation products include: CGA-62826, unidentified polar compounds and volatile compounds.

Soil metabolism studies showed that metalaxyl, under aerobic conditions can be expected to degrade with a half-life of about 2 weeks under field conditions and 7 weeks under laboratory conditions. Degradation products are: CGA-62826 as a major degradate and CGA-42447 as a minor degradate. CGA-62826 then breaks down to non-extractable material and CO_2. Under anaerobic soil conditions, metalaxyl breaks down with a half-life of about 9 weeks with CGA-62826 being the major degradation product, however, persisting longer than under aerobic conditions. CGA-62826 represents a maximum of 53.6% of the degradation products at 66 days, but thereafter, also degrades until it is 23% of the applied at 360 days. After 6 months, most of the applied activity was divided between CO_2 and non-extractable forms, metalaxyl is stable in sterile soil indicating soil microbes contributing to its breakdown under non-sterile conditions.

Metalaxyl and its aged soil residues are highly mobile via leaching in sandy soils low in organic matter. Also, soil adsorption of metalaxyl is minor as supported by its high leachibility. The amount of metalaxyl remaining in sandy soils 30 days after aerobic aging was 16.1% and in silty loam, it was 34.9%. In sandy soils, the leachate contained 56% Metalaxyl, 31% CGA-62826, and 1% unknown.

2.0 DISCUSSION OF DATA

The seventh interim ground water monitoring study was submitted in Volume 1 of 1, on 6/24/81, filed under accession No. 245315.

2.1 Data From The Tobacco Experimental Farm in Maryland

This study has now proceeded for 287 days after application. A total of 23.04 inches of rain has fallen since the first application, and a total of 18.69 inches since the second application (5/28/80 - 4/22/81). Water samples from six wells and one control well as well as soil samples were analyzed for parent. Soil and water samples collected 76 days following application were also analyzed for CGA-62826, a major soil degradation product.

Soil residue analysis at 287 days post application, showed no metalaxyl (≤0.05 ppm) below the 24 inch soil layer. The dry conditions which prevailed in Maryland during the 1980-81, might have contributed to the slow leaching of metalaxyl into the soil. Well water analysis at 287 days post application showed no (≤0.001 ppm) detectable metalaxyl in any of the samples analyzed. Soil residue analysis at 76 days for CGA-62826 showed no detectable quantities (≤0.05 ppm) of this metabolite in soils. Similarly, water sample analysis for CGA-62826, at 76 days post application showed values between <0.001 ppm to <0.005 ppm indicating the absence of significant CGA-62826 from water samples.

2.2 PESTAN MODEL

Input and output parameters are enclosed. Ciba-Geigy ran a PESTAN Leaching Model to predict leaching of metalaxyl through Florida and Maryland soils. The following information were given as the basis for calculating the input parameters: Soil texture in Florida was reported as sandy and that of Maryland as sandy loam. In both locations, the K_d was calculated using an average K_{om} value of 27.175 which was determined experimentally in sandy, sandy loam and silty loam soils with 1.2, 5.6 and 3.6% organic matter respectively. The organic matter for the Florida and Maryland sites were reported at 1%. The degradation rate coefficient was calculated based upon average $t_{1/2}$ of 58 days for metalaxyl under Florida conditions and 85 days under Maryland conditions. The half-lives were determined experimentally in the top 90 cm. of soil in Florida and 60 cm. in Maryland for a period of 154 days and 287 days after metalaxyl application in Florida and Maryland respectively. In this study, material balance was not given, hence, the relationship between degradation and leaching could not be assessed. In the soil metabolism study, however, in page 278 of this submission, a material balance was given. If a direct comparison ~~could~~ could be made between laboratory and field data, (assuming simulated field conditions in the laboratory, using soil samples from the experimental field), it could be seen that 7.5% of the parent and 45.6% of the acid degradate, CGA-62826, leached below 30 cm of the soil profile in 89 days (a total of 53.1%). This does not include approximately 1/2 of 7.8% of the material balance not accounted for under aerobic laboratory conditions (a total leachate of about 57%). The remainder of the parameters are taken from Clapp and Hornberger. The minimum and and maximum depth, the minimum and maximum projected time, and the number of days before beginning of recharge were not given by Ciba-Geigy.

4

1/85

According to Ciba-Geigy, PESTAN predicted the maximum leaching depth of metalaxyl to be 45 cm. in Florida and <15 cm. in Maryland. The non-predicted leaching in Maryland was due to the low recharge rate during the study period.

In our analysis, we re-checked Ciba-Geigy's model using the same input parameters. Predictions obtained in our output parameters showed the following:

(a) In Florida: Maximum leaching depth of metalaxyl is 400 cm from the soil surface in 720 days. Peak concentrations were 49 ppb 50 cm from the surface in 72 days and 5 ppb in the 100 cm soil profile 216 days post-application. In the 150-400 cm soil profile metalaxyl concentrations were less than 0.2 ppb.

(b) In Maryland: Maximum leaching depth of metalaxyl is 150 cm from the soil surface in 720 days. Peak concentration were 2 ppb 50 cm from the surface in 216 days. In the 100-150 cm soil profile, metalaxyl concentrations were less than 0.001 ppb.

In another run, we revised certain input parameters which are:

(a) The K_d: Was calculated on the basis of organic carbon and K_{oc} relationships rather than the organic matter and K_{om} relationships. The K_{om} obtained by Ciba-Geigy was modeled after soils high in organic matter, not typical of the Florida and Maryland locations.

(b) The Degradation Rate Coefficient: Conservatively, we took the average of Ciba-Gieigy's coefficient in order to correct for PESTAN's assumptions that biodegradation is depth independent when, in fact, it is not. The correct value should have been determined experimentally which, at this time, there is no known protocol for the experimental design.

(c) Application Rate: Ciba-Geigy used 2.24 kg/ha whereas, in our calculations we used the maximum registered dosage of 5.04 Kg/ha.

(d) The Recharge Rate: In Maryland, Ciba-Geigy used the actual rainfall during the test period which is about 60% of the normal. In our analysis, we used the average rainfall according to U. S. Weather Bureau and calculated the recharge rate according to Enfield.

Using the corrected parameters described above, the following PESTAN's predictions were obtained:

(a) In Florida: Metalaxyl leached through the 500 cm upper soil profile in 720 days. Peak concentration of 165 ppb was obtained 100 cm from the surface 144 days after application and 19 ppb in the 150 cm soil profile 288 days post-application. Concentration below 200 cm zone were <2ppb.

(b) In Maryland: Metalaxyl did not leach below the 350 cm zone in 720 days. Peak concentration of 119 ppb was obtained 100 cm from the surface 288 days after application and 17 ppb in the 150 cm soil profile 432 days after application. Concentrations in the 200-350 cm soil profile were <3 ppb.

23. Environmental Impact Statement of Metalaxyl (CGA-48988)

The 40-page statement contained environmental chemistry data previously submitted by Ciba-Geigy in support of metalaxyl registration on tobacco non-bearing citrus, certain ornamentals, and turf. Currently, the compound is being developed for use on cottonseed, potatoes, certain vegetables, hops, and avocados. In addition, the statement included the fish accumulation study requested in the EFB reviews of 8/24/81 and 9/1/81. Because data in the 40-pages environmental inpact statement were presented in an organized fashion, a copy of which is filed in the EFB with this review (7th ground water review). EFB concludes that data in our files adequately define the fate of metalaxyl in the environment. EFB, however, will continue to review the ongoing soil and ground water monitoring data from Maryland and Virginia.

3.0 SUMMARY OF RESULTS

3.1 SOIL RESIDUES

Soil residue analysis for metalaxyl in Suwanee County, Florida were discontinued in February 1981, 154 days after application because of the relative immobility of metalaxyl which remained in the unsaturated zone; i.e., in the upper 3 feet of soil profile.

Soil residue analysis in Maryland was continued because of the prevailing dry conditions during the 1980-81 season. Analysis at 287 days post-application showed no metalaxyl ($\leq$0.05 ppm) below the 24 inches of the upper soil profile. Similarly, soil residue analysis for the acid degradate, CGA-62826, 76 days after metalaxyl application, showed no detectable residue ($\leq$0.05 ppm) of this metabolite. Leaching under these dry conditions has been minimal.

3.2 Water Residues

Analysis of well water samples for metalalxyl in both Florida, through the 154 days of study, and Maryland through the 287 days study period showed no ($\leq$0.001 ppm) detectable metalaxyl in any of the samples analyzed. Well water analysis of the acid degradate, CGA-62826, 76 days after metalaxyl application, showed values between <0.001 ppm and <0.005 ppm indicating the absence of significant CGA-62826 from water samples.

3.3 The Indian River Monitoring Study in Florida

This study was requested by the Agency on January 12, 1981 to be carried at Fort Pierce Research Station in the Indian River area of Florida. According to Ciba-Geigy, because of lack of funds, the joint USDA, University of Florida, Ciba-Geigy project will not be conducted. Dr. Larry Balentine of Ciba-Geigy informed me through our phone communication on 9/17/81, that the project culd be re-initiated if the Agency so desires.

3.4 The Environmental Impact Statement of Metalaxyl

The 40-page statement contained environmental chemistry data previously reviewed in support of metalaxyl registration. In addition, the statement included the fish accumulation study requested in the EFB reviews of 8/24/81 and 9/1/81. EFB concludes that data in our files adequately define the fate of metalaxyl in the environment. EFB, however, will continue to review the ongoing ~~from~~ monitoring program from Maryland and Virginia.

4.0 CONCLUSIONS

EFB was not requested to make a final assessment on the entire ground water monitoring program for metalaxyl. However, at this time final conclusions could not be reached for the following reasons:

7

128

4.1 The Florida monitoring program was terminated in February 1981, 154 days after metalaxyl application. Although test results showed no detectable residue in soil samples below 3 feet, nor in well water samples, there is no assurance that this situation would prevail, particularly under continuous use of the chemical at the highest rate and under normal recharge rates.

4.2 The monitoring program in Maryland was continued under relatively dry conditions where recorded rainfall during the test period was about 60% of the normal average. As in Florida, metalaxyl dosage used was 2 lbs ai/A of the registered maximum of 4.5 lbs. ai/A.

4.3 A PESTAN leaching model employing corrected parameters (see attached input and output PESTAN sheets), predicts leaching of metalaxyl through 500 cm of soil profile.

5.0 RECOMMENDATIONS

5.1 The Environmental Fate Branch will concur with the conditional registration of metalaxyl on turf and other field crops currently pending at a maximum dosage of 3 pounds of the active ingredient per acre per year.

5.2 The Environmental Fate Branch will continue to review soil and ground water monitoring data from Maryland, particularly from locations where the highest label rate was used under normal recharge rates.

5.3 If a solution could be reached between USDA and the University of Florida, perhaps, the Indian River Study could be re-initiated. The Environmental Fate Branch would be interested in reviewing the program's results.

5.4 Copies of our PESTAN input and output parameters could be made available to Ciba-Geigy if requested so they may compare their analysis with ours.

Sami Malak

Sami Malak, Chemist
Review Section #1
Environmental Fate Branch/HED

8

User's Name Sami Malak Date 9/21/81

****
PESTAN Leaching Model Worksheet
****

Chemical : Metalaxy
Use Site (Crop) : Tobacco
Location (State) : Florida
Rainfall + Irrigation : 66.56 (Feb. 80 - Jan. 91)
Evapotranspiration (%) : 29.35"
Recharge (inches/year) : 37.21"

Soil Characteristics : Texture Sandy pH _____ CEC _____
Soil Composition (%) : OM 1 Sand _____ Silt _____ Clay _____

PESTAN Input Parameters

Solubility (ppm) 7100
Estimated Recharge Rate (cm/hr). . . 0.01078
Sorption Constant (k_d) . . . . . 0.272 (0.1891)*
Degradation Rate Coefficient (/hr) . . 0.0005 (0.00025)*
Bulk Density (gm/cc) 1.5
Soil Porosity (cm^3/cm^3). 0.395
Characteristic Curve Coefficient . . . 4.05
Air Entry Value (cm) 12.1
Dispersion Coefficient (cm^2/hr). . . . 0.06
Minimum Depth (cm) . . . . . (0)*
Maximum Depth (cm) . . . . . (500)*
Minimum Projected Time (day) . . . . . (0)*
Maximum Projected Time (day) . . . . . (720)*
Number of Applications 1
Application Rate (kg a.i./Ha). . . . . 2.24 (5.04)*
Days Before Beginning of Recharge. . . (10)*

*All parameters are Ciba-Geigy's except those between parenthesis.

User's Name Sami Malak Date 9/21/81

****
PESTAN Leaching Model Worksheet
****

Chemical : Metalaxyl
Use Site (Crop) : Tobacco
Location (State) : Maryland
Rainfall + Irrigation : 29.2 (45)* [May 80 - April 81]
Evapotranspiration (%) : 23.9" (20.5)*
Recharge (inches/year) : 5.3 (24.5)*

Soil Characteristics : Texture Sandy Loam pH _____ CEC _____
Soil Composition (%) : OM 1 Sand _____ Silt _____ Clay _____

PESTAN Input Parameters

Solubility (ppm)	7100
Estimated Recharge Rate (cm/hr)	0.00151 (0.00699)*
Sorption Constant (k_d)	0.272 (0.1891)*
Degradation Rate Coefficient (/hr)	0.00035 (0.000175)*
Bulk Density (gm/cc)	1.5
Soil Porosity (cm^3/cm^3)	0.435
Characteristic Curve Coefficient	4.9
Air Entry Value (cm)	21.8
Dispersion Coefficient (cm^2/hr)	0.06
Minimum Depth (cm)	(0)*
Maximum Depth (cm)	(500)*
Minimum Projected Time (day)	(0)*
Maximum Projected Time (day)	(720)*
Number of Applications	(1)*
Application Rate (kg a.i./Ha)	2.24 (5.04)*
Days Before Beginning of Recharge	(10)*

10

*All parameters are Ciba-Geigy's except those between parenthesis.

DEL USED:PESTAN
FLE: METALAXYL/TOBACCO/FLA/SHM/ DATE: 9/15/81
LUBILITY= 7100 ppm
CHARGE RATE= .01078 cm/hr
RPTION CONSTANT= .272
GRADATION RATE COEFFICIENT= .0005 /hr
LK DENSITY= 1.5 gms/cc
IL POROSITY= .395 cc/hr

CHARACTERISTIC CURVE COEFFICIENT= 4.05
AIR ENTRY VALUE= 12.1 cm
DISPERSION COEFFICIENT= .06 cm2/hr
LOADING= 2.21154
PROJECTED WATER CONTENT= .178487
PORE WATER VELOCITY= .0603967 cm/hr
POLLUTANT VELOCITY= .0183806 cm/hr
LENGTH OF POLLUTANT SLUG= .0174514 cm

MBER OF APPLICATIONS= 1 APPLICATION RATE= 2.24 kg a.i./Ha DAYS BEFORE RECHARGE= 10

SOLUTION CONCENTRATIONS (ug/ml)

PTHS	0 cm	50 cm	100 cm	150 cm	200 cm	250 cm	300 cm	350 cm	400 cm	450 cm	500 cm
1E-38 DAYS	0.36E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
72 DAYS	0.23E-03	0.49E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
144 DAYS	0.00E+00	0.26E-01	0.27E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
216 DAYS	0.00E+00	0.21E-04	0.45E-02	0.20E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
288 DAYS	0.00E+00	0.00E+00	0.11E-03	0.16E-03	0.31E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
360 DAYS	0.00E+00	0.00E+00	0.19E-06	0.39E-04	0.30E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
432 DAYS	0.00E+00	0.00E+00	0.00E+00	0.50E-06	0.39E-05	0.42E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
504 DAYS	0.00E+00	0.00E+00	0.00E+00	0.12E-08	0.26E-06	0.19E-06	0.49E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00
576 DAYS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.26E-08	0.45E-07	0.57E-08	0.89E-11	0.00E+00	0.00E+00	0.00E+00
648 DAYS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.73E-11	0.15E-08	0.40E-08	0.13E-09	0.00E+00	0.00E+00	0.00E+00
720 DAYS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.13E-10	0.39E-09	0.22E-09	0.23E-11	0.00E+00	0.00E+00

12

TITLE: METALAXYL/TOBACCO/FLA/SHM

)DEL USED:PESTAN
:TE: 9/17/81
)LUBILITY= 7100 ppm
:CHARGE RATE= .01078 cm/hr
)RPTION CONSTANT= .1891
:GRADATION RATE COEFFICIENT= .00025 /hr
)LK DENSITY= 1.5 gms/cc
)IL POROSITY= .395 cc/hr

CHARACTERISTIC CURVE COEFFICIENT= 4.05
AIR ENTRY VALUE= 12.1 cm
DISPERSION COEFFICIENT= .06 cm2/hr
LOADING= 4.99927
PROJECTED WATER CONTENT= .178487
PORE WATER VELOCITY= .0603967 cm/hr
POLLUTANT VELOCITY= .0233264 cm/hr
LENGTH OF POLLUTANT SLUG= .0394496 cm

)MBER OF APPLICATIONS= 1 APPLICATION RATE= 5.04 kg a.i./Ha

DAYS BEFORE RECHARGE= 10

SOLUTION CONCENTRATIONS (ppm)

:PTHS	0.0 cm	50.0 cm	100.0 cm	150.0 cm	200.0 cm	250.0 cm	300.0 cm	350.0 cm	400.0 cm	450.0 cm	500.0 cm
[0 DAYS	1.58E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
[72 DAYS	1.04E-04	1.71E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
[144 DAYS	0.00E+00	2.88E-02	1.65E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 216 DAYS	0.00E+00	3.15E-06	4.33E-02	1.84E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 288 DAYS	0.00E+00	0.00E+00	6.59E-05	1.88E-02	2.19E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 360 DAYS	0.00E+00	0.00E+00	0.00E+00	1.83E-04	5.02E-03	2.68E-04	1.91E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 432 DAYS	0.00E+00	0.00E+00	0.00E+00	1.88E-07	1.83E-04	1.06E-03	3.35E-05	4.70E-08	0.00E+00	0.00E+00	0.00E+00
T 504 DAYS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.24E-07	1.03E-04	1.94E-04	4.24E-06	0.00E+00	0.00E+00	0.00E+00
T 576 DAYS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.87E-07	4.00E-05	3.28E-05	5.43E-07	0.00E+00	0.00E+00
T 648 DAYS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.10E-09	8.96E-07	1.23E-05	5.26E-06	7.00E-08	0.00E+00
T 720 DAYS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.30E-09	5.54E-07	3.19E-06	8.12E-07	8.95E-09

EL USED: PESTAN
E: METALAXYL/TOBACCO/MD/SHM DATE: 9/15/81
BILITY= 7100 ppm
IARGE RATE= .00151 cm/hr
TION CONSTANT= .272
ADATION RATE COEFFICIENT= .00035 /hr
DENSITY= 1.5 gms/cc
POROSITY= .435 cc/hr

CHARACTERISTIC CURVE COEFFICIENT= 4.9
AIR ENTRY VALUE= 21.8 cm
DISPERSION COEFFICIENT= .06 cm2/hr
LOADING= 2.22232
PROJECTED WATER CONTENT= .254402
PORE WATER VELOCITY= 5.93548E-03 cm/hr
POLLUTANT VELOCITY= 2.27958E-03 cm/hr
LENGTH OF POLLUTANT SLUG= .0123034 cm

ER OF APPLICATIONS= 1 APPLICATION RATE= 2.24 kg a.i./Ha DAYS BEFORE RECHARGE= 10

SOLUTION CONCENTRATIONS (ug/ml)

HS	0 cm	50 cm	100 cm	150 cm	200 cm	250 cm	300 cm	350 cm	400 cm	450 cm	500 cm
E-38 DAYS	0.36E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
72 DAYS	0.90E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
144 DAYS	0.15E+00	0.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
216 DAYS	0.28E-01	0.17E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
288 DAYS	0.55E-02	0.13E-02	0.88E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
360 DAYS	0.11E-02	0.58E-03	0.45E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
432 DAYS	0.24E-03	0.21E-03	0.97E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
504 DAYS	0.51E-04	0.65E-04	0.91E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
576 DAYS	0.11E-04	0.18E-04	0.61E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
648 DAYS	0.24E-05	0.50E-05	0.32E-06	0.94E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
720 DAYS	0.53E-06	0.13E-05	0.14E-06	0.48E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

14

TITLE: METALAXYL/TOBACCO/SHM/MD

ODEL USED:PESTAN
ATE: 9/17/81
OLUBILITY= 7100 ppm
ECHARGE RATE= .00699 cm/hr
ORPTION CONSTANT= .1891
EGRADATION RATE COEFFICIENT= .000175 /hr
ULK DENSITY= 1.5 gms/cc
OIL POROSITY= .435 cc/hr

CHARACTERISTIC CURVE COEFFICIENT= 4.9
AIR ENTRY VALUE= 21.8 cm
DISPERSION COEFFICIENT= .06 cm2/hr
LOADING= 5.01547
PROJECTED WATER CONTENT= .254402
PORE WATER VELOCITY= .0274762 cm/hr
POLLUTANT VELOCITY= .0129913 cm/hr
LENGTH OF POLLUTANT SLUG= .0277672 cm

UMBER OF APPLICATIONS= 1 APPLICATION RATE= 5.04 kg a.i./Ha DAYS BEFORE RECHARGE= 10

SOLUTION CONCENTRATIONS (ppm)

EPTHS	0.0 cm	50.0 cm	100.0 cm	150.0 cm	200.0 cm	250.0 cm	300.0 cm	350.0 cm	400.0 cm	450.0 cm	500.0 cm
T 0 DAYS	1.11E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 72 DAYS	2.62E-01	7.09E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 144 DAYS	6.11E-03	9.73E-01	4.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 216 DAYS	1.69E-04	2.19E-01	5.96E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 288 DAYS	7.26E-06	1.81E-02	1.19E-01	1.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 360 DAYS	0.00E+00	1.01E-03	4.50E-02	1.22E-02	2.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 432 DAYS	0.00E+00	4.71E-05	7.41E-03	1.69E-02	5.49E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 504 DAYS	0.00E+00	1.74E-06	7.62E-04	7.92E-03	2.15E-03	1.56E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 576 DAYS	0.00E+00	2.49E-07	5.86E-05	1.89E-03	2.53E-03	1.40E-04	4.98E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 648 DAYS	0.00E+00	0.00E+00	3.65E-06	2.89E-04	1.34E-03	3.64E-04	5.79E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T 720 DAYS	0.00E+00	0.00E+00	2.31E-07	3.24E-05	4.04E-04	3.93E-04	2.99E-05	1.85E-07	0.00E+00	0.00E+00	0.00E+00