Shaughnessy Number: 110201

Date out of EFGWB: JUN 22 1990

To: Susan Lewis, PM 23
Product Manager
Registration Division (H7505C)

From: Emil Regelman, Supervisory Chemist
Environmental Fate Review Section #2
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Thru: Hank Jacoby, Chief
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Attached, please find the EFGWB review of...

Reg./File #: 55947-UR, 55947-UE, 55947-UG

Chemical Name: Prodiamine

Type Product: herbicide

Product Name: Endurance 65WDG

Company Name: Sandoz Crop Protection

Purpose: response to previous reviews -- hydrolysis, aerobic soil metabolism, leaching/adsorption/desorption, dissipation

Date Received: 1/26/90

Action Code: 116

EFGWB#(s): 90-0328, -0329, -0330

Total Reviewing Time (decimal days): 4

Deferrals to: ___ Ecological Effects Branch, EFED

___ Science Integration and Policy Staff, EFED

___ Non-Dietary Exposure Branch, HED

x Dietary Exposure Branch, HED

___ Toxicology Branch

RD90365 1.1

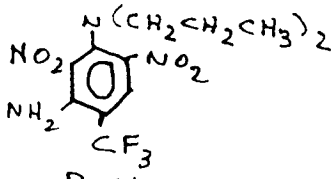
1. CHEMICAL:

chemical name: N^3,N^3-Di-n-propyl-2,4-dinitro-6-(trifluoromethyl)-m-phenylenediamine

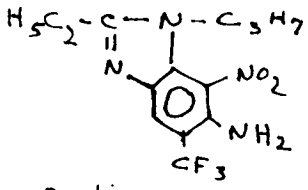
common name: Prodiamine

trade name: Endurance

structure:



Prodiamine



Prodiamine Benzimidazoli
(2 Stereoisomers)

CAS #: 29091-21-2

Shaughnessy #: 110201

2. TEST MATERIAL: discussed under individual DERs

3. STUDY/ACTION TYPE:

response to previous reviews on hydrolysis, aerobic soil metabolism, leaching/adsorption desorption, soil and turf dissipation

4. STUDY IDENTIFICATION:

Bowman, B. R., and Fennessey, M., **response to EFGWB review** of *DETERMINATION OF THE HYDROLYSIS RATE OF ^{14}C-PRODIAMINE*. performed by Analytical Bio-Chemistry Labs, Columbia, MO, sponsored and submitted by Sandoz Crop Protection Corp., Des Plaines, IL. dated 8/30/87. original study received EPA 4/19/88, MRID# 406091-01. **response received 1/18/90 under MRID # 413594-01**.

Kreuger, J.P., and Butz, R.G. **response to EFGWB review of** *AEROBIC SOIL METABOLISM OF PRODIAMINE*. performed and submitted by Sandoz Crop Protection Corporation, Des Plaines, IL. dated 12/23/87. original study received by EPA 4/19/88 under MRID# 405934-24. **response received 1/18/90 under MRID # 413594-02**.

Daly, D., **response to EFGWB review of** *SOIL/SEDIMENT ADSORPTION-DESORPTION WITH ^{14}C-PRODIAMINE FOLLOWING AEROBIC AGING*. performed by Analytical Bio-Chemistry Labs, Columbia, MO, sponsored and submitted by Sandoz Crop Protection Corp., Des Plaines, IL. dated 10/22/87. original study received EPA 4/19/88, MRID# 405934-26. **response received 1/18/90 under MRID # 413594-03**.

Smith, K., and Bade, T. **response to EFGWB review of** *DISSIPATION OF PRODIAMINE IN SOIL*. performed and submitted by Sandoz Crop Protection Corp., Des Plaines, IL. dated 4/7/88. original study received EPA 4/19/89, MRID# 405934-23. **response received 1/18/90 under MRID # 413594-04**.

Bade, T. and Rosas, M. **Dissipation of Prodiamine in a Georgia Turf Soil**. performed and submitted by Sandoz Crop Protection Corp., Des Plaines, IL. dated 1/12/88. received EPA 1/18/90, MRID# 413594-05.

5. REVIEWED BY:

Typed Name: E. Brinson Conerly

Title: Chemist, Review Section 2

Organization: EFGWB/EFED/OPP

E. B. Conerly 6/13/90

6. APPROVED BY:

Typed Name: Emil Regelman

Title: Supervisory Chemist, Review Section 2

Organization: EFGWB/EFED/OPP

JUN 22 1990

PRD90365 1.2

7. CONCLUSIONS:

1) Prodiamine is **stable to hydrolysis** (no degradation after 30 days -- all pHs).
2) Prodiamine **metabolizes slowly under aerobic conditions** (half-life ca. 2 months, one major degradate.
3) Based on an unacceptable study, the major degradate of prodiamine does not appear to be highly mobile, but a new study must be performed.
4) The previously submitted turf dissipation study is still unacceptable.
5) The **turf dissipation study** discussed in this review is acceptable. It **indicates that parent and major degradate do not leach.**

8. RECOMMENDATIONS:

The applicant should supply the following:

1) A new study in which the k_d of the primary degradate is determined.
2) An acceptable fish bioaccumulation study.

9. BACKGROUND:

Prodamine is an not-yet-registered herbicide used to control the germination of grasses and broadleaf weeds in ornamentals and turf. Label directions included in the submission indicate that it may be applied either to a cover crop (established turf) or to bare soil (around ornamental plants and in non-crop areas). The recommended label rate is up to 3.9 lb ai./A (3.9 ppm for a 3 inch soil layer) per single application or 7.8 lb a.i./A/yr.

Available data indicate a compound which is

- stable to hydrolysis
- slow to metabolize
- highly susceptible to photolysis in aqueous solution. Because of its extreme lability to photolysis in solution, it would also be expected to photolyze rapidly on leaf surfaces exposed to light, although there are no specific data in EFGWB files regarding photolysis on leaf surfaces
- strongly adsorbed to soils
- accumulated in both confined rotational crops and fish

Because of its extremely short photolytic half life and lack of mobility, Prodiamine does not appear likely to reach ground water. Though it is improbable that it would reach ground water, if somehow it did, it would persist there, since photolysis, the major mode of disappearance, would not occur.

Prodiamine does not appear to be a major threat to surface water since it photolyzes rapidly. Although the actual probability seems very low, any Prodiamine which is present on soil affected by a runoff event could be carried on suspended particles to adjacent bodies of surface water. Once there, it would be expected to remain in the sediment and degrade/dissipate very slowly.

The status of data requirements is as follows:

hydrolysis -- fulfilled by this submission -- discussed in this review -- a half life in excess of 6 months is indicated at all three pHs

photolysis in water -- fulfilled 5/13/80 -- not done under current Guidelines. A short half life (ca. 20 min.) is indicated

soil photodegradation -- submitted study unacceptable as of 5/14/80, not required for this use

aerobic soil metabolism -- fulfilled by this submission -- discussed in this review -- half-life ca. 2 mos, one major product

anaerobic soil metabolism -- submitted study unacceptable as of 5/14/80, not required for this use

leaching/adsorption/desorption -- fulfilled for parent -- aged study discussed in this review -- **NEW STUDY REQUIRED ON AGED MATERIAL** -- the mobility of primary degradate is unknown at this time

turf terrestrial field dissipation -- fulfilled by this submission -- discussed in this review, no leaching or significant dissipation noted

confined accumulation on rotational crops -- satisfied 5/14/80, not required for this use -- no significant accumulation except in root crops -- not done under current Guidelines

fish bioaccumulation -- study submitted but not acceptable, significant accumulation and slow depuration

Physical/Chemical characteristics are as follows:

dark yellow odorless crystalline powder
m.p. 124-125° C
vapor pressure 2.5×10^{-7} mm Hg at 25° C
water solubility 0.05 ppm
octanol/water coefficient (k_{ow}) 3.3×10^{4}

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES: See individual DERs.

11. COMPLETION OF ONE-LINER: one-liner not on file, information given to J. Hannan

12. CBI APPENDIX: attached to individual DERs

DATA EVALUATION REVIEW 1

I. Study Type: hydrolysis

II. Citation:
Bowman, B. R., and Fennessey, M., **response to EFGWB review** of *DETERMINATION OF THE HYDROLYSIS RATE OF ^{14}C-PRODIAMINE.* performed by Analytical Bio-Chemistry Labs, Columbia, MO, sponsored and submitted by Sandoz Crop Protection Corp., Des Plaines, IL. dated 8/30/87. original study received EPA 4/19/88, MRID# 406091-01. **response received 1/18/90 under MRID # 413594-01**.

III. Reviewer:

Typed Name: E. Brinson Conerly
Title: Chemist, Review Section 2
Organization: EFGWB/EFED/OPP

E.B. Conerly 5/17/90

IV. Conclusions:

The additional information makes the original study acceptable. Prodiamine is stable to hydrolysis (no observed degradation after 30 days at any pH).

V. Materials and Methods:

test compounds -- Prodiamine uniformly ^{14}C-labelled in the phenyl ring, 98.8% radiopure, before purification 25 mCi/mmol, after purification ?; analytical grade prodiamine
reference compounds -- despropyl prodiamine, and didespropyl prodiamine
test buffers
pH 5 -- acetic acid/acetate (ca. 0.1 M)
pH 7 -- tris/HCl (ca. 0.05 M), HEPES/KOH (ca. 0.01 M)
pH 9 -- boric acid/borax (ca. 0.01 M)
analytical methods
TLC -- precoated Merck RP-18F 2545, eluted with MeOH/H_2O (90/10)
LSC -- on spots scraped from TLC plates

VI. Study Author's Results and/or Conclusions:

^{14}C-prodiamine, is slow to hydrolyze in the pH range 5-9. No significant degradation of the test compound was detected after 30 days of hydrolysis.

VII. Reviewer's Comments:

1) EFGWB original comment -- Identification of a compound by TLC in a single solvent is not usually definitive. Also, the TLC does not show the separation of a mixture of the three analytes. There could be some overlap under these conditions. Confirmatory analyses such as GC/MS are required.

Applicant response -- ... In this study, however, there was no need to do any definitive identification of hydrolysis products because none were formed at a concentration greater than 10% of the applied radiocarbon. The largest hydrolysis product formed reached 9.87% of the starting activity at pH

9. This hydrolysis product was clearly separated from prodiamine as shown by autoradiographs of the TLC plates of the pH 9 sample after 7, 14, 22 and 30 days. Unfortunately, these spots were faint on the original autoradiograph and very difficult to see in the photos... Nevertheless, we do have data to show that this minor hydrolysis product was clearly separated from parent when chromatographed as the mixture. Also, as stated in the original report, this minor product was tentatively identified as despropyl prodiamine. Evidence is presented [... in the original report.] Further identification of this product was not attempted because this product was never present at greater than 9.87%.

EFGWB reply -- This evidence should be made part of EFGWB files if a usable photocopy can be produced.

2) EFGWB comment -- EFGWB agrees that prodiamine does not show a pattern of degradation over the 30-day experiment. The prodiamine content appears to vary randomly rather than trending downward with time, as the low correlation coefficients for the linear regression equations (r = 0.4-0.6) demonstrate.

Applicant response -- We disagree with the reviewer's statement that "the prodiamine concentration appears to vary randomly rather than trending downward with time"....At this low concentration ... the variation reported is well within what is expected from experienced personnel working in the 40 ppb range.

EFGWB reply -- The applicant and EFGWB agree. The data vary within an expected range of experimental error (i.e. randomly). Since this comment did not identify a deficiency, none exists to be resolved.

VIII. CBI Information Addendum: n.a.

DATA EVALUATION REVIEW 2

I. Study Type: aerobic soil metabolism

II. Citation:

Kreuger, J.P., and Butz, R.G. **Aerobic Soil Metabolism of Prodiamine.** performed and submitted by Sandoz Crop Protection Corp., Des Plaines, IL. dated 12/23/87. received EPA 4/19/88, MRID# 405934-24.

III. Reviewer:

Typed Name: E. Brinson Conerly
Title: Chemist, Review Section 2
Organization: EFGWB/EFED/OPP

E. B. Conerly 5/17/90

IV. Conclusions:

Original study -- This study may fulfill the requirement for aerobic soil metabolism data if the applicant supplies acceptable information to clarify and demonstrate the validity of the analytical method.

With additional information discussed below, the study has been made acceptable.

Prodiamine has a $t_{1/2}$ ca. 2 months under aerobic soil metabolism conditions in Kenyon loam. There is one major degradate, 6-amino"benzimidazole", [see below for full name -- EBC], which is apparently persistent (30% of applied at 365 days.

V. Materials and Methods:

materials:
- test compound -- uniformly ring labelled ^{14}-C prodiamine: 25.0 mCi/mmol, 98% radiopure, mixed as a solution with analytical standard to a spec. act. of 17600 dpm/ug
- test soil -- Kenyon loam (characteristics in attached list)

methods
- application -- @ 2.50 ug/gm
- incubation -- in the dark; soil maintained @ 75% of 0.33 bar; 70% relative humidity, 25^0 C. To trap volatiles, CO_2-free, water-saturated air was passed continuously from reaction chambers into ethylene glycol and KOH vessels.
- sampling
  - soil -- 0, 1, 3, 7, 14 days, 1, 2, 3, 4, 6, 9, and 12 months
  - volatile traps -- as soil
- extraction -- soil was extracted 2 x with MeOH, and then 2 x with Et_2O
- analyses
  - TLC
    - MeOH extracts -- Hexane/EtOAc (7:3)
    - Et_2O extracts -- Hexane/EtOAc (8:2), developed 2 x
  - LSC --TLC spots were scraped, eluted with MeOH and counted
  - GC/MS -- unchromatographed MeOH extracts; TLC spots

VI. Study Author's Results and/or Conclusions:

The half-life of prodiamine applied at a rate of 2.50 mg/gm in aerobic soil was 57 days. The only major metabolite was **6-amino-2-ethyl-7-nitro-1-propyl-5-trifluoromethyl-benzimidazole (6-amino-benzimidazole)**. The benzamidazole concentration peaked at 0.82 ug/gm (32.8% of applied) at 270 days, and had declined to 0.74 ug/gm (29.6% of applied) at 365 days. **Despropyl prodiamine** reached a maximum of 0.09 ug/gm after 60 days. **Reduced prodiamine** reached a maximum of 0.03 ug/gm at 180-365 days. **Unextractables** increased with time to 0.9 ug/gm (36.8% of applied) by 365 days. Uncharacterized material at the TLC origin and with R_f lower than that of benzimidazole probably represented reaction products more than benzimidazole, and appeared only at low levels throughout the experiment.

Recovery of soil residues as determined by combustion ranged around 73% ($\pm$ %), apparently due to experimental error inherent in the combustion procedure.

Cumulative evolution of CO_2 amounted to 2.8% of the applied dose at 365 days.

Base extractable and EtOAc extractable were 6% and 13.6% respectively at 365 days.

Control soil treated with $HgCl_2$ as well as prodiamine showed no reduction in total radioactivity in 365 days.

VII. Reviewer's Comments, Applicant Responses, EFGWB reply:

1) EFGWB comment -- The long-lived degradates may be more of a concern than parent compound, which is only moderately stable to metabolism. EFGWB defers to Residue and Tox branches to make this determination.

Applicants' response -- this comment does not call for a reply.

EFGWB reply -- We agree.

2) EFGWB comment -- Table VI (attached) requires clarification. The separation achieved by these TLC solvent systems is somewhat marginal. Also, it is not clear whether the systems mentioned as D through G were used once (for a total of two developments/plate) or twice each (for a total of four developments/plate), and whether the TLC plates were developed in one or two dimensions. (From the examples in the submission, this reviewer concludes that the TLCs were one-dimensional.)

Applicants' response -- Samples were quantitated with system A and system F. In these systems separation of prodiamine from all other metabolites occurs, but most importantly, prodiamine is significantly separated from its major metabolite, 6-amino-benzimidazole [(referring to the original study) Table VII and Table VIII]. In solvent systems D -

G, plates were developed once in one dimension...allowed to dry...then developed once in the same dimension...

EFGWB reply -- The tables to which the applicant refers contain "bands" of r_f values, and the amounts of radioactivity found in these bands. It is correct that 6-amino benzimidazole, the major metabolite, is well separated from parent and that the other metabolites are present in small quantities only. This deficiency is resolved.

3) EFGWB comment -- The significance of the applicant's statement that the "sterile" soil showed no loss of total radioactivity is obscure, unless it is intended to imply that some microbial action in the "live" samples renders a portion of radioactivity unrecoverable.

Applicants' response -- The sterile control soil ... is run to give some indication if metabolism is biologically mediated. The complete lack of reduction of total radiocarbon in the sterile soil suggests that no metabolism of Prodiamine occurred in sterile soil... Therefore, Prodiamine metabolism may be biologically mediated. However, the EPA Pesticide Assessment Guideline, Subdivision N, Environmental Fate: Chemistry Series 162-1 does not require the determination of whether or not degadation is in fact biologically mediated.

EFGWB reply -- This comment did not identify a deficiency, and therefore there is none to resolve. The intent of the comment was to clarify whether the applicant perceived that microbial activity made a difference in <u>recoverability</u> of total applied material.

VIII. CBI Information Addendum: n.a.

DATA EVALUATION REVIEW 3

I. Study Type: adsorption/desorption

II. Citation:

Daly, D., **Soil/Sediment Adsorption-Desorption of Soil Incorporated with ^{14}C-Prodiamine Following Aerobic Aging**. performed by Analytical Bio-Chemistry Labs, Columbia, MO, sponsored and submitted by Sandoz Crop Protection Corporation, Des Plaines, IL. dated 10/22/87. received EPA 4/19/88, MRID# 405934-26.

III. Reviewer:

Typed Name: E. Brinson Conerly
Title: Chemist, Review Section 2
Organization: EFGWB/EFED/OPP

E. B. Conerly 5/17/90

IV. Conclusions from the original study:

The study does not fulfill the data requirement for two main reasons:

1) It did not test four different soil types.
2) It measured only the total combined radioactivity of parent and major degradate.

The data do suggest that both compounds are immobile in Kenyon loam. The aged mixture should be tested in four soil types using analytical methods which distinguish between parent and degradate.

Conclusions from the additional material:

The study still does not satisfy the data requirement. The best available evidence suggests that the degradate may be mobile compared to parent, but the extent of its mobility cannot be assessed from these data.

V. Materials and Methods:

Extractable material from prodiamine-treated soil was adsorbed on Kenyon loam soil, and K_ds and K_{oc}s of adsorption and desorption of the mixture determined.

test material -- ^{14}C-prodiamine applied to soil at 3.02 ug and 53,000 dpm/gm dry soil, supplied by the sponsor as aged aerobically for 30 days. The soil was extracted 2 x with MeOH (1 ml/gm soil) with shaking and filtered. Extracts were analyzed for total radioactivity, and the extracted soil was combusted for determination of residual radioactivity.

VI. Study Author's Results and/or Conclusions:

The extract contained 69.4% prodiamine, and 21.8% prodiamine benzimidazole. The degradate identity was confirmed by GC/MS. [Combined] $K_d$ads of 117.4, $K_d$des of 210.7, K_{oc}ads of 5340, and K_{oc}des of 9580, indicated immobility. Mean recovery of radioactivity was 93.4% $\pm$ 6.93%. K_{ads} of the "pure" parent compound, determined in another experiment, were as follows:

sand	--	$k_d$ads = 19.54, k_{oc} = 19540
silt loam	--	$k_d$ads = 54.47, k_{oc} = 10890
clay loam	--	$k_d$ads = 181.6, k_{oc} = 9310
sandy loam	--	$k_d$ads = 398.5, k_{oc} = 12860

VII. Reviewer's Comments:

EFGWB comment -- The study provides only supplementary information, since just one soil was tested, and four different ones are required. Immobility of both compounds is suggested by the results.

Applicants' response -- ... There is no mention that the aged study is to be done with more than one soil... We therefore conclude this study meets the regulatory requirement for aged soil adsorption/desorption as defined by current EPA guidelines and relevant addendums to those guidelines.

EFGWB reply -- The single soil in the aged compound test is not one of the four used for studying the unaged parent. If the K_d of the parent and aged material had been determined for the same soil, a comparison of the two K_d values could be made, and the relative mobility of the degradate assessed with some confidence -- i.e., if the combined value were larger than that for parent compound alone, it would be safe to conclude that the degradate is less mobile, at least in that soil. There are at present no data which can be directly compared in this way. In the most similar soil tested in the other study, parent compound had a k_d about 50% higher than the combined value for parent and metabolite in this study. This could mean that the metabolite is more mobile. Since the metabolite is long-lived, EFGWB has requested that Health Effects Division determine whether it is of concern. Pending their opinion, EFGWB will not require an aged study in four different soils at this time. A new leaching study in one soil should be performed in which individual values for parent and product are determined. It is strongly suggested that the soil be one used in the test on parent compound.

VIII. CBI Information Addendum: attached

110201 PRODIAMINE RIN 1786-93

Page_____ is not included in this copy.

Pages 12 through 14 are not included.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

_____ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

✓ FIFRA registration data.

_____ The document is a duplicate of page(s) _____.

_____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

Applicant response -- ...The cores from each plot were [kept] separate, sub-samples were not composited across plots... we ... have separate analysis of two plots, one analysis of a single core for each plot and two analyses of a two-core composite for each plot...

EFGWB reply -- Our understanding of the protocol is that for each plot one analysis was performed on an uncomposited sample and duplicate analyses on a different (composited) sample -- two independent specimens, three analyses which may have been done independently (i.e. in separate runs). In future studies EFGWB most strongly recommends a minimum of three independent replicate specimens from each plot for each time and depth. If early analytical results indicate that inter-sample variability is low, some compositing may then be justifiable.

2) EFGWB comment -- [See highlighted text above.] The amount of material reaching the soil from a turf application would not be expected to be uniform. This observation does not invalidate the study.

Applicant response -- no response necessary, none given

3) EFGWB comment -- No analytical values were supplied for the control plot.

Applicant response -- No residues were found in any of the control samples.

EFGWB reply -- This information is noted.

VIII. CBI Information Addendum: n.a.

DATA EVALUATION REVIEW 5

I. Study Type: field dissipation on turf

II. Citation:

Sandoz Crop Protection Corporation. **Dissipation of Prodiamine in a Georgia Turf Soil**. dated 12/1/88. Received EPA 1/18/90 under MRID # 413594-05.

III. Reviewer:

Typed Name: E. Brinson Conerly
Title: Chemist, Review Section 2
Organization: EFGWB/EFED/OPP

E.B. Conerly 5/17/90

IV. Conclusions:

Prodiamine and its major degradate do not show a pattern of leaching when applied to turf in a sandy loam soil.

V. Materials and Methods:

MATERIALS

test material -- commercial sample of prodiamine 65WDG

test protocol -- prodiamine was applied at 2 lb ai/A to a turf plot in Donaldsonville, GA. The test plot was further divided into four subplots. A control plot was 66 feet upslope from the test plot. 1.5 inches of rain had fallen within 24 hours before application, and immediately after application, an additional 0.5 inches of water was irrigated onto the plots

sampling protocol -- soil cores were collected at 0, 1, 15, 30, 62, 90, 120, 150, 181, 209, and 273 days post application. Five subsamples were taken from within each of the four subplots, and these subsamples were composited [for a total of 4 independent samples for each time and depth -- EBC].

test soil -- sandy loam, characteristics attached

analysis -- by method AM-0817 (protocol provided) which utilizes silica gel chromatography clean-up, followed by gas chromatography. Prodiamine and its 6-amino-imidazole metabolite were both determined. The limit of detection for both compounds is 0.01 ppm; average recoveries from fortified samples were better than 90 for both compounds.

VI. Study Author's Results and/or Conclusions:

RESULTS

Prodiamine applied at 2 lb a.i./A (2 ppm for a 3 inch soil layer) was found at 0.050 to 1.09 ppm in the 1 - 10 cm cores, and in most samples none was found below that depth (lod 0.5% of applied) in three of four subplots. In subplot 100, residues occurred at 10 - 20 cm on day 250. In three subplots, 100, 300, and 400, residues were found at 15 - 20 cm on day 273, in amounts ranging from 0.014 to 0.068 ppm.

Imidazole metabolite was detected in 1 - 10 cm cores on day 90, 150, 181, 209, and 273 at levels up to 0.021 ppm (1% of applied). None was found at any lower depth.

CONCLUSIONS

The calculated half-life of prodiamine under the conditions of this study was 69 days.

The absence of residue in the 10 - 15 cm samples and the 20 - 30 cm samples and the lack of a pattern of leaching with time or depth were inconsistent with leaching behavior. Therefore, these residues [where they did occur] are believed to be the result of contamination during sampling.

The absence of meaningful residue levels below the 0 - 10 cm depth indicates a very low leachability of both prodiamine and its 6-amino-imidazole metabolite, which is consistent with the aqueous solubility of these compounds and laboratory leaching studies.

VII. Reviewer's Comments:

Except for isolated samples from the 10 - 20 cm depth, there is no apparent pattern of residue in lower soil cores. The applicant has attributed the detection in these specimens to contamination from the surface sample taken immediately before.

Increases in later time samples seem to occur in all subplots, and may be due to rainfall carrying material from the turf into the soil. Sampling times did not coincide with rainfall events, so it is difficult to confirm the connection.

VIII. CBI Information Addendum: attached

110201 PRODIAMINE RIN 1786-93

Page_____ is not included in this copy.

Pages 18 through 21 are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

✓ FIFRA registration data.

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