

US EPA ARCHIVE DOCUMENT

FILE COPY

Date Out EFB: **SEP 30 1982**

To: Frank Gee
Product Manager 17
Registration Division (TS-767)

From: Samuel M. Creeger, (Acting) Head *SMC*
Review Section No. 1
Environmental Fate Branch
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No.: 35977-EUP-R

Chemical: Ethyl [2-(p-phenoxyphenoxy)ethyl]carbamate

Type Product: Insect growth regulator

Product Name: Ro 13-5223

Company Name: Maag Agrochemicals Research and Dev., HLR Sciences, Inc.

Submission Purpose: EUP for use on stored peanut seed

ZBB Code: other

ACTION CODE: 700

Date In: 8/4/82

EFB # 423

Date Completed: SEP 30 1982

TAIS (level II)

Days

61

0.5

Deferrals To:

Ecological Effects Branch

Residue Chemistry Branch

Toxicology Branch

147-6

272-95

105301

1. INTRODUCTION/DISCUSSION

1.1 The proposed use of Ro 13-5223 is to protect stored seed peanuts from insect pests. The pesticide will not be environmentally dispersed until the treated peanuts are planted. Seed peanuts are to be treated before storage with Ro 13-5223 resulting in a concentration of 1 ppm on the peanuts. According to Crop Production: Principles and Practice, 4th ed.; Metcalfe and Elkins; 1980, a maximum of 125 pounds of seed peanut are planted per acre. Assuming no degradation of ai during storage, this will result in 0.000125 lb ai/A in the soil when the peanuts are planted.

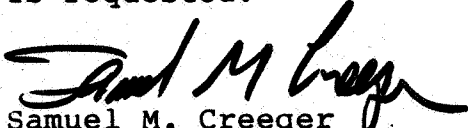
1.2 Testing will be done at one site in Florida using a total of 0.16 lb ai.

1.3 The compound is stable to hydrolysis (pH 3, 7 and 9 at 35 and 50 °C) and degrades aerobically in soil with a half-life of 2 - 3 months. The ai is extensively degraded (according to preliminary reports) resulting in no major degradation products.

2. RECOMMENDATIONS

2.1 EFB concurs with the proposed permit.

2.2 Due to the low application rate (in terms of lb ai/A), the low poundage of ai involved and the expedite request, the data was not evaluated in detail at this time. However, the environmental fate data must be resubmitted for review when registration is requested.


Samuel M. Creeger
September 30, 1982
Section #1/EFB
Hazard Evaluation Division

Ro 13-5223

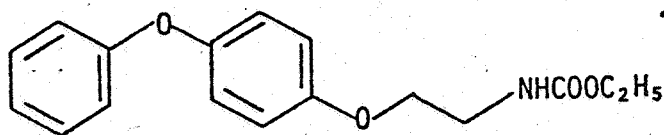
INSECT GROWTH REGULATOR

Ro 13-5223 is a non-neurotoxic insecticide which expresses its activity as an insect growth regulator (IGR). Field trials and laboratory experiments conducted during the past four years showed Ro 13-5223 to be effective against mosquito larvae, roaches, stored product pests, various lepidopterous pests, fire ants, ticks and fleas.

CHEMICAL AND PHYSICAL PROPERTIES

Chemical name: Ethyl[2-(p-phenoxyphenoxy)ethyl]carbamate

Structure:



Form: white, crystalline solid

Odor: odorless

Melting point: pure 53-54°C; technical (97-98%) 50-53°C

Vapor pressure: 1.3×10^{-7} Torr (at 25°C) = 1.7×10^{-7} m Bar = 1.7×10^{-5} Pa

Stability: The compound is stable under normal conditions.
No hydrolysis was observed in dioxane:water 1:1 at pH 4, 7 & 10

Solubility of Ro 13-5223
in Some Common Solvents

<u>Solvent</u>	<u>Solubility</u> <u>% (w/w)</u>
Water	0.0006 (6PPM)
Acetone	<u>≥</u> 24
Diethyl Ether	<u>≥</u> 26
Dimethylformamide	<u>≥</u> 21
Ethyl Acetate	<u>≥</u> 22
Hexane	0.8
Isopropanol	<u>≥</u> 24
Methanol	<u>≥</u> 24
N-methylpyrrolidone	<u>≥</u> 20
Toluene	<u>≥</u> 23

FOR EXPERIMENTAL USE ONLY

MAAG

Ro 13-5223 125 EC (ACR 2984F)

Insect growth regulator for
evaluation in the control of insect
pests in stored seed peanuts

KEEP OUT OF THE REACH OF CHILDREN

C A U T I O N

See Back Panel for Additional Precautionary Statements

Not for use by any other than a
participant or cooperator of the EPA-
approved experimental use program

APPLY THIS PRODUCT ONLY AS SPECIFIED BY THIS LABEL

Active Ingredient..Ethyl[2-(p-phenoxyphenoxy)ethyl]carbamate....	13.7%
Inert Ingredients.....	<u>86.3%</u>
	100.0%

Contains 1.04 lb active ingredient per gallon or 125 grams active ingredi-
ent per liter

EPA EUP No.

EPA Est No 35977-SW-01

NET CONTENTS: 300 ml

Distributed By

Maag Agrochemicals, P. O. Box X, Vero Beach, FL 32960

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Ro 13-5223

HAZARD TO HUMANS AND DOMESTIC ANIMALS

C A U T I O N

May be harmful if swallowed. Avoid breathing spray mist. Avoid contact with clothing, skin or eyes. In case of contact, flush skin or eyes with plenty of water. Get medical attention if irritation persists. Do not use on food or fodder crops.

ENVIRONMENTAL HAZARDS

Keep out of lakes, streams and ponds. Do not contaminate water by cleaning of equipment or disposal of wastes.

STORAGE AND DISPOSAL

Store away from heat. Protect from freezing. Do not re-use container. Thoroughly rinse container with water prior to disposal.

DIRECTIONS FOR USE

Mix 7.0 ml of the 125 EC in 1280 ml water and spray the solution on one (1) ton (2000 lb) of peanuts as they enter the warehouse. This will result in a final concentration of 1.0 ppm on the peanuts. The spray solution should be continuously agitated as the treatment is being applied.

Ro 13-5223

PROPOSED EXPERIMENTAL PROGRAM

The proposed experimental use of Ro 13-5223, Insect Growth Regulator, for the control of lepidopterous pests of stored peanuts involves the treatment of 40 tons of peanuts. The quantity of material to be shipped for this purpose is 0.16 gallons (600 ml) of Ro 13-5223 ACR 2984F 125 g/l EC. The solution contains 0.17 lbs (75 g) active ingredient.

The experimental program will be supervised by entomologist Mr. J. T. Bridges. His address, telephone number and professional qualifications are appended.

The one state selected for the proposed program is Florida. A definite site within the state will be selected by cooperating USDA research personnel.

Peanuts, stored for use in the spring for seed, will be treated as they enter the warehouse. One application will be made in early October. A concentration of 1.0 ppm ai on the stored peanuts will be evaluated. Control efforts will be directed against lepidopterous pests, mainly the almond moth, of the stored peanuts. Evaluation of effectiveness will be determined by the reduction of adult moths and damage to the peanuts.

The objectives of the experimental program are to determine the effectiveness of Ro 13-5223, Insect Growth Regulator, for controlling lepidopterous pests of stored seed peanuts. Assessments are enumerated in the appended protocol, US82-2.33.

The amount of material required for USDA cooperators conducting the field trial US82-2.33 has been calculated on a separate page incorporated in this section. The test will evaluate one application rate of 7.0 ml (0.88 g/ai) of the 125 g ai/l formulation per ton. This application rate will result in a final concentration on the peanuts of 1.0 ppm. The proposed test involves one unreplicated plot (one 40 ton warehouse). These figures are summarized in a table showing the quantity of material needed in the state and the quantity of peanuts to be treated.

Initial shipment of material in October of 1982; a one year period for the experimental permit is proposed.

All unused material at the conclusion of the test program will be returned to the supplier.

MATERIAL REQUIRED FOR STORED PEANUT TRIAL

Trial No.: US82-2.33

Cooperator: Dr. K. W. Vick
 Agricultural Research
 Southern Region
 Insect Attractants, Behavior and Basic Biology Laboratory
 1700 SW 23rd Drive
 P. O. Box 14565
 Gainesville, Florida 32604

<u>Plot Size</u>	<u>No. Reps.</u>	<u>Ro 13-5223 per ton</u>	<u>Ro 13-5223 per treatment</u>
40 tons	1	0.868 g ai	37.5 g ai
			*overage-- <u>37.5 g ai</u>
			75.0 g ai or 600 ml of 125 EC

* Required for calibration of the spray equipment and to maintain pressure in the tank and line.

Ro 13-5223 Insect Growth Regulator
Stored peanut pest control

Dr. K. W. Vick, USDA
Gainesville, FL
(904) 373-6701

Trial No: '82-2.33 **104**
Location: Williston, FL
Crop: Stored seed peanuts
Sci. Name of Pest: Ephestia cautella

Application Dates: Common Name of Pest: ... almond moth
Application Stage (a) of Crop: peanuts entering warehouse (b) of Pest: larvae
Type of Equipment: compressed air sprayer Spray Volume: 1280 ml/ton
Variety: Plot Size: one 40 ton warehouse Replications: 1
Climatic Conditions:
Test Method: As the peanuts enter the warehouse they will be sprayed with a solution
of Ro 13-5223 that will result in a final concentration on the peanut of
1.0 ppm
Evaluation: At various intervals posttreatment samples of peanuts will be taken
examined for insect damage, and compared to the check warehouse.
.....
.....

Test Variants:

Concentration ppm

check 0

Ro 13-5223 1.0

ENVIRONMENTAL FATE SUMMARY

Evaluation of the environmental fate of Ro 13-5223 indicates that this compound shows low environmental mobility and a fairly rapid dissipation. In water, Ro 13-5223 has a photolytic half-life of ca 6 hours, indicating that this material will not be persistent in the aquatic environment. Field trials to determine residue dissipation in water are also in progress, to further clarify this picture.

The soil metabolism of Ro 13-5223 is in the process of being characterized. An aerobic soil metabolism study has been running nearly four months and the first results are quite encouraging. Table 1 summarizes results to date. Ring labeled ^{14}C -Ro 13-5223 is being incubated at 5 ppm in three soil types, Steinmaur loam soil (5.6% organic matter), Dielsdorf sandy loam soil (4.3% organic matter), and Commugny sandy loam soil (2.1% organic matter). The three month readings presented here show that Ro 13-5223 is being extensively metabolized to bound metabolites and CO_2 . Since the ^{14}C -Ro 13-5223 is ring labeled, the presence of label in CO_2 would indicate that the Ro 13-5223 is being totally mineralized. Earlier readings during the course of the experiment indicate that the buildup of bound residues and the production of $^{14}\text{CO}_2$ is progressive and increasing with time. The four month readings which have been taken to date confirm this impression indicating the evolution of substantially more $^{14}\text{CO}_2$ than in previous readings. The metabolic origin of the bound residues and CO_2 has been confirmed by running parallel studies on sterilized Steinmaur, Commugny and Dielsdorf soils. Radiolabeled Ro 13-5223 remained stable and extractable in all three soils for the one month duration of the experiment.

Table 1. Aerobic Metabolism of ^{14}C -Ro 13-5223 in Three Soil Types: Distribution of ^{14}C at Three Months

<u>Soil Type</u>	Percentage (%) of Applied Dose Recovered		
	<u>Extractable</u>	<u>Bound</u>	<u>$^{14}\text{CO}_2$</u>
Commugny sandy loam	23.3	42.7	14.7
Dielsdorf sandy loam	49.3	34.8	8.1
Steinmaur loam	33.2	41.2	9.7

The soil mobility of Ro 13-5223 has also been examined. Leaching studies show that this material shows little or no potential to move in the soil profile. Studies were performed in two soil types, Steinmaur loam soil (5.6% organic matter) and Wallis sandy loam soil (1.4% organic content). Soil columns (30 cm) were eluted with 393 ml of water, equivalent to 200 mm

of rainfall, over a period of 2 days. All but traces of the radioactivity recovered were in the top 5 cm of the soil column for both soils, indicating little or no leaching of Ro 13-5223. In the Steinmaur loam soil, about 60% of the recovered radioactivity was extractable and about 40% was bound to the soil. For the Wallis sandy loam soil, about 85% of the recovered radioactivity was extractable and about 15% was bound to the soil. Only trace amounts of metabolites were detected in the extracted radioactivity; most of the extracted material was in the form of parent compound; however, the presence of bound residues in both soils would indicate that some metabolism was taking place. Similar results were obtained with residues of Ro 13-5223 which had been aged in Steinmaur loam soil for 30 days prior to leaching. When the aged residue was placed in a column of Steinmaur soil and leached over a period of 40 days, 93.6% of the applied radioactivity was recovered in the top 5 cm of the column, showing no leachability. A small amount of the applied dose, 1.8%, was recovered in the 5-10 cm section of the column, indicating that small amounts of the aged residue had a very limited ability to leach. In this experiment about 80% of the recovered radioactivity was extractable and about 17% remained bound to the soil. These results would indicate that aged residues of Ro 13-5223 behave in a similar fashion to unaged Ro 13-5223 residues.

The low soil mobility of Ro 13-5223 has been confirmed with binding studies using radiolabeled material in four soil types: Steinmaur loam (5.6% organic matter), Dielsdorf sandy loam (4.3% organic matter), Commugny sandy loam (2.1% organic matter), and Wallis sandy loam (1.4% organic matter). To determine binding constants, 4 concentrations of ^{14}C -Ro 13-5223 were shaken with soil for 24 hours. The Freundlich binding constants obtained in these studies are in Table 2. These data indicate that Ro 13-5223 is strongly bound to the Steinmaur, Dielsdorf and Commugny soils. Binding to the Wallis soil was more moderate. These results tend to confirm the low mobility of Ro 13-5223 in soil. This low mobility of Ro 13-5223 combined with its extensive metabolism in soil and low use rates indicate that little environmental hazard will be associated with Ro 13-5223 residues.

Table 2. Binding of ^{14}C -Ro 13-5223 to Four Soil Types

<u>Soil Type</u>	<u>Freundlich Adsorption Constant (K)</u>
Steinmaur loam	77
Dielsdorf sandy loam	49
Cummugny sandy loam	77
Wallis sandy loam	18

INTERNE MITTEILUNG

CONFIDENTIAL

an:MF: Standard Distribution

von : Dr. P. Dieterle and R. Kaufmann

Kopien an:HC: Dr. P.A. Vonder Mühl

Datum: 25.5.1982 /HSt

Dr. A. Pryde

SOCAR

VERO BEACH: Dr. Stanton

RES File

Betrifft: Hydrolysis Study with the Radiolabelled Insecticide
Ro 13-5223/0241. SUMMARY

Ro 13-5223/024 (^{14}C -labelled in the dioxyphenyl ring) was incubated at a concentration of 0.97 ppm at pH values of 3.0, 7.0 and 9.0 and in distilled water at temperatures of 35 °C and 50 °C for up to 70 and 51 days, respectively. Samples were analysed in duplicate at each sampling point.

Ro 13-5223 was hydrolytically stable under all conditions investigated.

lcc
27.5.82

P. Dieterle
27.5.82