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202318  
RECORD NO.

122804  
SHAUGHNESSY NO.

                      
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 09/08/87 OUT 9/23/87

FILE OR REG. NO. 618-OT

DATE OF SUBMISSION 08/25/87

DATE RECEIVED BY HED 09/03/87

RD REQUESTED COMPLETION DATE 11/16/87

EEB ESTIMATED COMPLETION DATE 11/16/87

RD ACTION CODE/TYPE OF REVIEW 181

TYPE PRODUCT(S): I, D, H, F, N, R, S Insecticide

DATA ACCESSION NO(S). 403186-1, -2, -3

PRODUCT MANAGER NO. G. LaRocca (15)

PRODUCT NAME(S) Agri-mec 0.15 EC (Avermectin)

COMPANY NAME Merck Sharp and Dohme Rsch Laboratories

SUBMISSION PURPOSE Submission of Avian Reproduction Study  
and Earthworm Toxicity Study to Support  
Cotton Use

SHAUGHNESSY NO. CHEMICAL & FORMULATION 8 A.I.  
Avermectin

EEB Review

Abamectin

100 Submission Purpose

The registrant, Merck and Co., provided additional data to support the registration of Abamectin on cotton. The risk assessment of this new use is presented in a previous review dated 9-14-87. The data provided with this submission were included in that review.

101 Adequacy of Data

Two studies were provided, an earthworm 28-day toxicity test and an avian reproduction test.

A. Earthworm Test:

Test Material: 97% ai

Test Species: Eisenia foetida

Category: Supplemental, study does not fulfill any guideline requirement.

Results:

7-day	LC50=62 ppm	95% C.L.	52-73 ppm
14-day	LC50=33 ppm	95% C.L.	28-39 ppm
28-day	LC50=18 ppm	95% C.L.	24-32 ppm

B. Avian Reproduction Test:

Test Species: Mallard duck

Test Material: 94.7%

Category: Core

Results: NOEL = 12 ppm  
LEL = 64 ppm

There were no statistically significant effects on avian reproduction at the highest test level 12 ppm. In the pilot reproduction test, there was a marked reduction in eggs laid at the 64 ppm level.

103 Conclusions

The data provided support registration of Abamectin on cotton.

*Daniel Rieder* 9.22.87  
Daniel Rieder, Wildlife Biologist  
Ecological Effects Branch  
Hazard Evaluation Division

*for Allen W. Vaughan* 9.23.87  
Norman J. Cook, Head Section 2  
Ecological Effects Branch  
Hazard Evaluation Division

*Harry T. Craven* 9/30/87  
Harry T. Craven, Acting Chief  
Ecological Effects Branch  
Hazard Evaluation Division

DATA EVALUATION REPORT

1. Chemical: Abamectin, 122804
2. Test Material: 94.7% a.i.
3. Test Type: Avian Reproduction test with Mallard ducks
4. Study Identification: Author: Joann Beavers, 2-26-87  
Title: A One-generation Reproduction Study with the Mallard  
(Anas platyrhynchos)  
Study Number: 105-135A  
Study Sponsor: Merck and Company, Inc.  
Study Location: Acc. No. 403186-01  
Laboratory: Wildlife International LTD

5. Review By: Daniel Rieder  
Wildlife Biologist  
EEB/HED

*Daniel Rieder*

Date: 9.22.87

6. Approved By: *for* Norman J. Cook  
Head Section 2  
EEB/HED

*Allen W. Vaughan*

Date: 9.23.87

7. Conclusions:

This study report is scientifically sound and fulfills the requirements (71.4) for an avian reproduction test with a waterfowl (mallard ducks). The results of the test were that no statistically significant reproductive effects were observed at 12 ppm which was the highest level tested. However, the average number of eggs laid was markedly less at 64 ppm in the pilot study.

8. Recommendations: NA

9. Background:

This test was provided to support registration.

10. Discussion of Individual Tests: NA

## 11. Materials and Methods

The test material was 94.7% pure abamectin identified as L 676,863-000V064, Purity 94.7% ai, Avermectin B. (Abamectin), composition 86.9 wt % Bla, 7.8 wt % Blb".

This test material was mixed in a game bird ration with corn oil and acetone. Treated feed was prepared weekly. Samples for residue analysis were frozen immediately and shipped to Merck Sharp and Dohme Rsch. Lab. Residue analysis was also performed on feed that had been aged 7 days to demonstrate stability of test material on avian feed. Treatment levels were a control and 3, 6 and 12 ppm. There were 16 pens per test level, 1 drake and 1 hen per pen.

### Study Phases:

1. Acclimation	4 weeks	(8/15/86 - 9/9/86)
2. Prephotostimulation photoperiod: 8 hrs/day	8 weeks	(9/9/86 - 11/4/86)
3. Pre-egg laying (with photostimulation)	2 weeks	(11/5/86 - 11/18/86)
4. Egg laying photoperiod 17 hrs/day	8 weeks	(11/18/86 - 1/16/87)
5. Post-adult sacrifice (final incubation, hatching, and 14-day offspring rearing period)	6 weeks	(1/16/87 - 2/26/87)

All adult birds were observed at least once daily and a record of all mortalities and observations maintained. Adults were weighed at study initiation, and on weeks 2, 4, 6, 8, and at study termination. Food consumption was also estimated daily.

The following reproductive parameters were observed and recorded: Eggs Laid, Eggs Cracked, Eggs Set, Viable Embryos, hatchlings, 14 day old survivors, body weight of 14-day old survivors and egg shell thickness.

See attachment 1 for more detailed methods.

Upon completion of the study, all reproductive parameters were analyzed statistically using Dunnett's method following arcsine transformation.

## 12. Reported Results

The test diet analysis results shows that immediately after mixings abamectin residues ranged from 97% to 114.5% of nominal. Analysis of aged treated diet showed Abamectin was stable during 7-day aging between feed mixing.

There was one mortality, a hen in one of the 6 ppm pens. There were no statistically significant differences between the control group and the treatment groups in any reproductive parameter. The reproductive NOEL = 12 ppm.

In the Pilot Reproduction Study, there was a marked reduction in number of eggs laid at the 64 ppm test level.

See attachment 2 for a discussion and results and tables.

13. Study Authors Conclusions

The avian reproductive NOEL = 12 ppm.  
LEL = 64 ppm

14. Reviewers Discussion

A. Test Procedure

The protocol was acceptable.

B. Statistical Analysis - No reviewer statistical analysis was performed since the averages for observable responses at the highest test level were essentially the same as those of the control.

C. Discussion of Results The results indicate that Abamectin is not likely to affect avian reproduction at 12 ppm, but is expected to reduce number of eggs laid at 64 ppm dietary concentrations.

D. Adequacy of Study

Category: Core

15. Completion of One-Liner - Completed

16. CBI Appendix - The attachments are considered CBI

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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 product 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
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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.

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DATA EVALUATION REVIEW

1. Chemical: Abamectin 122804
2. Test Material: 97% ai
3. Test Type: 28-day earthworm toxicity test
4. Study Identification: Cargile, Nancy, 2/12/87, Earthworm Toxicity Study of MK-936 (ivermectin B1) in Artificial Soil. Unpublished study prepared by Biospherics Incorporated for Merck and Company. Laboratory Project No: 85-E-073 EW. Acc # 403186-03

5. Review By: Daniel Rieder  
Wildlife Biologist  
EEB/HED

Daniel Rieder  
Date: 8-22-87

6. Approved By: Norman J. Cook  
Head, Section 2  
EEB/HED

Allen W. Vaughan  
Date: 9-23-87

7. Conclusions:

This study is scientifically sound but does not fulfill any guideline requirement. The test indicates that when pre-mixed with sand and added to artificial soil, Abamectin exhibits the following LC50's:

7 days	62 ppm 95% c.l.	52-73 ppm
14 days	33 ppm 95% c.l.	28-39 ppm
28 days	18 ppm 95% c.l.	24-32 ppm

8. Recommendations: N/A

9. Background: This test was provided as additional information on the effects of Abamectin on the environment.

10. Discussion of Individual Tests: N/A

11. Methods and Materials

Ten earthworms (Eisenia foetida) per container, 4 replicate containers per level were tested for 28 days at 10, 25, 50, 100 and 200 ppm of Abamectin. See the attached description of Test procedures for more detail, Attachment 1.

12. Reported Results

See Attachment 2 for mortality data.

13. Authors Conclusions

The following LC50's and 95% C.L. were calculated.

<u>duration</u>	<u>LC50</u>	<u>95% C.L.</u>
7 days	62 ppm	52.73 ppm
14 days	33 ppm	28-39 ppm
28 days	18 ppm	24-32 ppm

14 Reviewers Conclusions

The protocol cannot be judged against acceptable Agency methodologies as none have been established. However, the procedure was such that it provides useful information on the effects of Abamectin on earthworms in artificial soil.

The 28 day LC50 and 95% C.L. was recalculated using the moving average and probit method. The results were 18.7 (14.9-22 and 18.6 (15.2-22), respectively see attachment 3.

The results indicate that in artificial soils Abamectin may be expected to kill 50% of the earthworms at a concentration of 18.6 ppm.

Category: Supplemental

15. One Liner: Completed

16. CBI Appendix: The attachments are Confidential Business Information.

Avermectin science review

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  - Description of product quality control procedures
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NOTE: BECAUSE THERE WAS CONTROL MORTALITY, AND NONE OF THE LOWER CONCENTRATIONS PRODUCED ZERO MORTALITY, THE DATA HAS BEEN SUBJECTED TO ABBOTT'S CORRECTION.

Daniel Rieder Abamectin earthworm 09-14-87

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
200	39	39	100	0
100	39	39	100	0
50	39	36	92.3077	0
25	39	26	66.6667	0
10	39	7	17.9487	0

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 18.49431

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	B	LC50	95 PERCENT CONFIDENCE LIMITS		
3		7.169055E-02	18.70871	14.75542	22.55625

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	B	H	GOODNESS OF FIT PROBABILITY
5	7.258982E-02	1	.9515426

SLOPE = 3.452581  
 95 PERCENT CONFIDENCE LIMITS = 2.544273 AND 4.421651

LC50 = 18.43009  
 95 PERCENT CONFIDENCE LIMITS = 15.16234 AND 22.24461

LC10 = 8.043273  
 95 PERCENT CONFIDENCE LIMITS = 5.25012 AND 10.51663

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