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) Agrimec 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 % A.I.
Avermectin
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 fetida*
Category: Supplemental, study does not fulfill any guideline requirement.

Results:

<table>
<thead>
<tr>
<th>Duration</th>
<th>LC50</th>
<th>95% C.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-day</td>
<td>62 ppm</td>
<td>52-73 ppm</td>
</tr>
<tr>
<td>14-day</td>
<td>33 ppm</td>
<td>28-39 ppm</td>
</tr>
<tr>
<td>28-day</td>
<td>18 ppm</td>
<td>24-32 ppm</td>
</tr>
</tbody>
</table>

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.
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

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
   Date: 9.22.87

6. Approved By: Norman J. Cook
   Head Section 2
   EEB/HED
   Date: 9.21.87

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

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
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.
DATA EVALUATION REVIEW

1. Chemical: Abamectin 122804

2. Test Material: 97% ai

3. Test Type: 28-day earthworm toxicity test


5. Review By: Daniel Rieder
Wildlife Biologist
EEB/HED
Date: 8-22-87

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

<table>
<thead>
<tr>
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<th>95% C.L.</th>
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</tr>
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<td>18 ppm</td>
<td>24-32 ppm</td>
</tr>
</tbody>
</table>

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.
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
___ Information about a pending registration action
X 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.
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.

<table>
<thead>
<tr>
<th>CONC.</th>
<th>NUMBER EXPOSED</th>
<th>NUMBER DEAD</th>
<th>PERCENT DEAD</th>
<th>BINOMIAL PROB. (PERCENT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>39</td>
<td>39</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
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<tr>
<td>50</td>
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<td>25</td>
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<td>24</td>
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<tr>
<td>10</td>
<td>39</td>
<td>?</td>
<td>17.5487</td>
<td>0</td>
</tr>
</tbody>
</table>

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 METHODS.

AN APPROXIMATE LOGO FOR THIS SET OF DATA IS 15.4943.

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

<table>
<thead>
<tr>
<th>SPAN</th>
<th>G</th>
<th>LC50</th>
<th>95 PERCENT CONFIDENCE LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.1679*5581-10</td>
<td>18.7087</td>
<td>14.76542</td>
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</table>

RESULTS CALCULATED USING THE PROBIT METHOD

<table>
<thead>
<tr>
<th>ITERATIONS</th>
<th>G</th>
<th>M</th>
<th>GOODNESS OF FIT PROBABILITY</th>
<th>SLOPE</th>
<th>95 PERCENT CONFIDENCE LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.2569*5581-10</td>
<td>1</td>
<td>1.154420</td>
<td>3.450542</td>
<td>2.844273 AND 4.450542</td>
</tr>
<tr>
<td>5</td>
<td>18.8204</td>
<td>1</td>
<td>12.16283 AND 21.74601</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6.045273</td>
<td>1</td>
<td>5.25015 AND 6.81590</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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