

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

1. Chemical: Metalaxyl (Shaughnessy #113501)
2. Formulation: CGA-48988 (Technical, 90.1% purity)
3. Citation: EG & G, Bionomics. 1980. Addenda to aquatic invertebrate life cycle study (EPA Accession #244183). 22pp. Submitted by CIBA-GEIGY and contained within Accession #244782.
4. Reviewed by: James D. Felkel
Wildlife Biologist
Ecological Effects Branch/HED
5. Date Reviewed: 5/13/81
6. Test Type: Invertebrate life-cycle (addendum)
 - A. Test Species: Daphnia magna
7. Reported Results: Not applicable (addendum contains raw data only)
8. Reviewer's Conclusions: Provision of the daphnid life-cycle study data in a form amenable to statistical analysis and confirmation of submitted results enables the submitted study (reviewed 3/11/81) to meet the intent of the 7/10/78 Guidelines for this type of test. The minimum amount of test material necessary to elicit an adverse response from D. magna, under the conditions of the submitted study, was determined to be greater than 1.2 mg/l and less than 2.7 mg/l.

Submission Description

This submission contains the raw survival and reproduction data for the two-generation daphnid life-cycle study reviewed 3/11/81. Data is provided for all days (except weekends and holidays) between test days 7 and 21 and between test days 25 and 42.

Reviewer's Analysis

A. Introduction

The aquatic invertebrate life-cycle study previously submitted (Accession #244183) reported a minimum threshold concentration (the minimum amount of test material, in water, to elicit an adverse response by D. magna) of greater than 1.2 mg/l and less than 2.7 mg/l, but did not provide survival and reproduction data in a format suitable to statistically confirm this. This data was requested in the 4/8/81 EEB Review on Metalaxyl, has been submitted, and is reviewed here. The original Data Evaluation Record (dated 3/11/81) contains a description of materials, methods, and results.

B. Statistical Analyses

1. Mortality

Analyses of Variance by this reviewer confirmed that cumulative mortality within the four (4) replicates at each test level on test days 21 and 42 (the end of first and second generation studies, respectively) were significantly different ($p < 0.05$) from controls only at mean measured concentrations of 10 mg/l and 18 mg/l, as reported. This was checked in two ways: 1) by using cumulative mortality data for these days and 2) using the arcsine transformation of percent survivability at these days.

2. Reproduction

Analyses of Variance confirmed that cumulative production of offspring per female [within the four (4) replicates per concentration] at the end of the first generation was significantly different ($p < 0.05$) from controls only at the mean measured concentrations of 4.5 mg/l and above while at the end of the second generation it was significantly different ($p < 0.05$) at 2.7 mg/l and above. Cumulative production of offspring per female at 1.2 mg/l was not significantly different ($p > 0.05$) from controls for either generation in this analysis.

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The above analyses indicate that a minimum threshold concentration would be greater than 1.2 mg/l but less than 2.7 mg/l. As an additional check, to be certain that there were no statistically significant differences in reproduction between controls and the 1.2 mg/l test level, the following analyses were conducted on the first generation data (where differences in the mean cumulative production of young per female at 1.2 mg/l compared to controls were greater than in the second generation):

- 1) raw numbers of progeny for the control and 1.2 mg/l test level were analyzed for all nine (9) days on which daphnids were counted between test days 9 and 21; and
- 2) the cumulative production of offspring were analyzed for the same test levels & days as in #1 above.

Both of these analyses also confirmed that there was no significant difference ($p > 0.05$) in reproduction between the controls and the 1.2 mg/l test level.

3. Summary

Based on the data submitted, survival and reproduction at the 1.2 mg/l test level were not significantly different ($p > 0.05$) from controls. Since reproduction was significantly different ($p < 0.05$) at the 2.7 mg/l level, during at least the second daphnid generation, the minimum threshold concentration of greater than 1.2 mg/l and less than 2.7 mg/l is confirmed.

Conclusions

1. Category: The daphnid life-cycle study is now upgraded to Core.
2. Rationale: Submission of the daphnid life-cycle study data in a form amenable to statistical analysis and confirmation of submitted results enables the submitted study (Accession #244183, DER dated 3/11/81) to meet the intent of the 7/10/78 Guidelines for this type of test.
3. Repairability: N/A