8 6-12-00

MRID No. 445050-14

**DATA EVALUATION RECORD**
**§ 143 - PREDATORY INSECT ACUTE TOXICITY TEST**

1. **CHEMICAL:** Mesotrione PC Code No.: 122990

2. **TEST MATERIAL:** ZA1296 100 g $l^{-1}$ suspension concentrate (9.4% w/w)

3. **CITATION:**

| | |
|---|---|
| Author: | H.M. Austin |
| Title: | A Laboratory Study to Evaluate the Effects of ZA1296 on the Parasitic Wasp *Aphidius rhopalosiphi* |
| Study Completion Date: | August 7, 1997 |
| Laboratory: | Ecotox Limited, Tavistock, Devon, England |
| Laboratory Report ID: | ER-97-25 |
| Sponsor: | ZENECA Ag Products, Wilmington, DE |
| DP Barcode: | D245475 |
| MRID No.: | 445050-14 |

4. **REVIEWED BY:** Mark Mossler, M.S., Toxicologist, Golder Associates Inc.

**Signature:** [signature] **Date:** 8/26/98

**APPROVED BY:** Pim Kosalwat, Ph.D., Senior Scientist, Golder Associates Inc.

**Signature:** P. Kosalwat **Date:** 8/26/98

5. **APPROVED BY:**

**Signature:** [signature] **Date:** 6/12/00

6. **STUDY PARAMETERS:**

**Scientific Name of Test Organism:** *Aphidius rhopalosiphi*
**Definitive Study Duration:** Mortality-48 h/Fecundity-13 d

7. **CONCLUSIONS:** This study is scientifically sound and provides supplemental information pertaining to the toxicity of ZA1296. The 48-hour $LC_{50}$ for parasitic wasps exposed to dried residues of the suspension concentrate of ZA1296 was greater than the proposed labeled rate (200 g ai/ha). This rate also served as the NOEC for mortality and fecundity. ~1.1 lbs ai/A

8. **ADEQUACY OF THE STUDY:**

**A. Classification:** Supplemental.

B. **Rationale:** There is no EPA guideline requirement for a predatory insect acute toxicity test.

C. **Repairability:** N/A.

9. **GUIDELINE DEVIATIONS:** N/A.

10. **SUBMISSION PURPOSE:**

11. **MATERIALS AND METHODS:**

A. **Test Organisms**

| Criteria | Reported Information |
|---|---|
| **Species:** | *Aphidius rhopalosiphi* |
| **Age at beginning of test:** | Adults |
| **Supplier:** | In-house cultures |
| **All insects from the same source?** | All wasps from the same source and the same age |

B. **Test System**

| Criteria | Reported Information |
|---|---|
| **Chamber size adequate?** | Yes |
| **Lighting:** | 16-h light, 8-h dark |
| **Temperature:** | 18.1-23.1°C |
| **Relative humidity:** | 58-80% |

C. **Test Design**

| Criteria | Reported Information |
|---|---|
| **Range finding test?** | None reported |
| **Reference toxicant tested?** | Yes, dimethoate (336 g active ingredient [ai]/ha) |

| Criteria | Reported Information |
|---|---|
| **Method of administration:** | *A. rhopalosiphi* adults were reared on honey water in boxes containing a treated glass surface for 48 hours, then surviving females were placed in an enclosure containing aphids (*Rhopalosiphum padi*) for 24 hours. Number of parasitized aphids determined 12 days later. |
| **Nominal doses:** Sufficient number of dosage levels to yield statistically sound data. | Glass surface sprayed at the equivalent of 200 g ai/ha in a volume of 200 l/ha (21 GPA) |
| **Controls:** Negative control and/or diluent/solvent control. | Diluent (deionized water) and positive control groups |
| **Number of wasps per box:** | 10 (5 female and 5 male) |
| **Number of boxes per group:** 3 replicate chambers per group is recommended. | Four boxes per treatment or control group |
| **Solvent:** Distilled water or the following solvents: dimethyl-formamide, triethylene glycol, methanol, acetone, ethanol. | Suspension concentrate dispersed in deionized water |
| **Volume of test solution:** | 200 l/ha |
| **Observation period:** | Mortality assessed at 30 min., 2, 24, and 48 hours after transfer to exposure boxes and fecundity measured at 13 days after female transfer to cage with untreated barley seedlings infested with aphids |
| **Maximum labeled rate:** | The proposed application rate is 200 g ai/ha |

12. **REPORTED RESULTS:**

| Criteria | Reported Information |
|---|---|
| **Quality assurance and GLP compliance statements were included in the report?** | Yes |
| **Control Mortality:** | 17.5% mortality in the control group, 20% in the treatment group |
| **Raw data included?** | Yes |
| **Signs of toxicity (if any) were described?** | Yes |

Other Significant Results: Adult wasps were either classified as moribund or dead (no adverse effects were reported). Although there was a 3% reduction in survival and a 9% reduction in fecundity, these reductions were not significant at the 95% level of confidence (determined by ANOVA). A formula was used to predict total effect of the pesticide by integrating both corrected mortality of the adults and fecundity of the female wasps. This total effect was used to place the pesticide in one of four IOBC categories: Class 1 - <30% effect (harmless), Class 2 - 30-80% effect (slightly harmful), Class 3 - 80-99% effect (moderately harmful), and Class 4 - >99% effect (harmful). The author stated that the results of the test (12.7% total effect) place the test material into Class 1 - "harmless." By 24 hours after transfer to the dimethoate-treated chambers, all wasps were dead.

13. **VERIFICATION OF STATISTICAL RESULTS:** Mortality and female wasp fecundity were compared with the use of a t-test. A significant reduction in mortality or fecundity was not detected.

14. **REVIEWER'S COMMENTS:** This study is scientifically sound and provides supplemental information pertaining to the toxicity of ZA1296. The 48-hour $LC_{50}$ for parasitic wasps exposed to dried residues of the suspension concentrate of ZA1296 was greater than the proposed labeled rate (200 g ai/ha). This rate also served as the NOEC for mortality and fecundity.

Wasp 48-hour mortality
File: wasp Transform: ARC SINE(SQUARE ROOT(Y))

EQUAL VARIANCE t-TEST - TABLE 1 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | MEAN CALCULATED IN ORIGINAL UNITS | T STAT | SIG |
|---|---|---|---|---|---|
| 1 | Control | 1.154 | 0.825 | | |
| 2 | Treatment | 1.114 | 0.800 | 0.390 | |

2 Sample t table value = 1.94 (1 Tailed Value, P=0.05, df=6,1)

UNEQUAL VARIANCE t-TEST Ho:Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | MEAN CALCULATED IN ORIGINAL UNITS | T STAT | SIG |
|---|---|---|---|---|---|
| 1 | Control | 1.154 | 0.825 | | |
| 2 | Treatment | 1.114 | 0.800 | 0.390 | |

2 Sample t table value = 2.13 (1 Tailed Value, P=0.05, df=4,1)

Wasp 48-hour mortality
File: wasp Transform: ARC SINE(SQUARE ROOT(Y))

EQUAL VARIANCE t-TEST - TABLE 2 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | NUM OF REPS | Minimum Sig Diff (IN ORIG. UNITS) | % of CONTROL | DIFFERENCE FROM CONTROL |
|---|---|---|---|---|---|
| 1 | Control | 4 | | | |
| 2 | Treatment | 4 | 0.173 | 21.0 | 0.025 |

UNEQUAL VARIANCE t-TEST Ho:Control<Treatment

| GROUP | IDENTIFICATION | NUM OF REPS | Minimum Sig Diff (IN ORIG. UNITS) | % of CONTROL | DIFFERENCE FROM CONTROL |
|---|---|---|---|---|---|
| 1 | Control | 4 | | | |
| 2 | Treatment | 4 | 0.192 | 23.3 | 0.025 |

Wasp fecundity
File: wasp Transform: NO TRANSFORMATION

EQUAL VARIANCE t-TEST - TABLE 1 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | MEAN CALCULATED IN ORIGINAL UNITS | T STAT | SIG |
|---|---|---|---|---|---|
| 1 | Control | 4.333 | 4.333 | | |
| 2 | Treatment | 3.933 | 3.933 | 0.246 | |

2 Sample t table value = 1.70 (1 Tailed Value, P=0.05, df=28,1)

UNEQUAL VARIANCE t-TEST Ho:Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | MEAN CALCULATED IN ORIGINAL UNITS | T STAT | SIG |
|---|---|---|---|---|---|
| 1 | Control | 4.333 | 4.333 | | |
| 2 | Treatment | 3.933 | 3.933 | 0.246 | |

2 Sample t table value = 1.71 (1 Tailed Value, P=0.05, df=25,1)

Wasp fecundity
File: wasp Transform: NO TRANSFORMATION

EQUAL VARIANCE t-TEST - TABLE 2 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | NUM OF REPS | Minimum Sig Diff (IN ORIG. UNITS) | % of CONTROL | DIFFERENCE FROM CONTROL |
|---|---|---|---|---|---|
| 1 | Control | 15 | | | |
| 2 | Treatment | 15 | 2.764 | 63.8 | 0.400 |

UNEQUAL VARIANCE t-TEST Ho:Control<Treatment

| GROUP | IDENTIFICATION | NUM OF REPS | Minimum Sig Diff (IN ORIG. UNITS) | % of CONTROL | DIFFERENCE FROM CONTROL |
|---|---|---|---|---|---|
| 1 | Control | 15 | | | |
| 2 | Treatment | 15 | 2.775 | 64.0 | 0.400 |