DATA EVALUATION RECORD
AQUATIC INVERTEBRATE LIFE CYCLE TEST
GUIDELINE 72-4(B)

1. CHEMICAL: PIRATE™; AC 303,630  \(\text{PC Code No.}: 129093\)

2. TEST MATERIAL: 4-bromo-2-(4-chlorophenyl)-1-(ethoxymethyl)-
5-(trifluoromethyl)-1H-pyrrole-3-carbonitrile

Purity: 94.5%

3. CITATION

Authors: Ward, G. Scott, Wisk, Joseph D., Davis, Jay W.

Title: Chronic Toxicity of AC 393,630 to the
Mysid (Mysidopsis bahia) Under Flow Test
Test conditions

Study Completion Date: July 6, 1994

Laboratory: Toxikon Environmental Sciences, 106
Coastal Way, Jupiter, Florida 33477

Sponsor: American Cyanamid Company, Agricultural
Research Division, P.O. Box 400,
Princeton, NJ 08543-0400

Laboratory Report ID: J9301002

MRID No.: 434928-21

DP Barcode: D210808

4. REVIEWED BY: William Evans, Biologist
Ecological Effects Branch
Environmental Fate and Effects Division

Signature: [Signature]

Date: 12/9/96

5. APPROVED BY: Ann Stavola, Section Chief, Section 5
Ecological Effects Branch
Environmental Fate and Effects Division

Signature: [Signature]

Date: 12/9/96

6. STUDY PARAMETERS

Age of Test Organism: <24 hours old at test
initiation

Definitive Test Duration: 28 days

Study Method: Flow-through

Type of Concentrations: Mean measured

7. CONCLUSIONS: According to study authors', the most sensitive
endpoint to mysid shrimp was survival. The NOEC was observed
to be 0.172 \(\mu\text{g/L}\). However, this effect level cannot be
confirmed since insufficient raw data was provided to verify
the statistical test for survival. Specifically, the
replicate data for first generation males was missing. In
order to confirm the authors' results, this data must be submitted. Additionally, individual growth data as dry weight by sex was not submitted and statistical analysis could not be performed. This data must also be submitted. This study is, therefore, classified as supplemental. Upon verification of the statistics this study may be classified as core.

**Results Synopsis**

NOEC: 0.172 µg/L  LOEC: 0.385 µmg ai/L  MATC: 0.257 µg ai/L

**LOEC's for specific effects**
- Young/Female/Repro. Day: 0.970 µg ai/L
- Larvae Survival: 0.385 µg ai/L
- Growth 1) length: Male >3.86 µg ai/L
  - Female >3.86 µg ai/L
  - Male & Female >3.86 µg ai/L
- 2) weight: Male ____ µg ai/L
  - Female ____ µg ai/L
  - Male & Female 3.86 µg ai/L

8. **ADEQUACY OF THE STUDY**

A. **Classification:** Supplemental

B. **Rationale:** Insufficient raw data was provided to verify the statistical test for survival. Data for first generation males needs to be submitted. Additionally, individual growth data as dry weight by sex needs to be submitted to perform statistical analysis.

C. **Repairability:** N/A

8. **MAJOR GUIDELINE DEVIATIONS:**

1. The age of Parental Stock should be at least 10-12 days old at the beginning of the acclimation period. The age of parental stock was not mentioned.

2. Pairing of mysids should be accomplished on the same day and should be conducted when most of the mysids are sexually mature (usu. 10-14 days after test initiation). It does not appear that the mysids were separated into pairs.

3. Food concentration was not mentioned. Guidelines recommend 5 mg/L (dry wt.) of synthetic food or 10⁶ cells/L of algae.

4. The water Temperature must not deviate from 20°C by more than 5°C for more than 48 hours. According to
protocol the target water temperature was 27 ± 2°C with a measured range of 26.1 to 29°C which deviates more than 5°C for more than 48 hours.

5. Total hardness of dilution water was not mentioned in the study. A hardness of 160 to 180 mg/L as CaCO₃ is recommended.

6. A minimum of 15 mysids per compartment, 2 compartments per chamber, 2 chambers per concentration for a total of 60/level should be distributed before pairing. Two replicates each containing 2 screened chambers with 10 mysids/chamber for a total of 40/level were distributed for this test.

7. During the test, difference between highest and lowest measured salinities must be less than 10 g/kg, should be measured daily, and should be between 15 and 30 g/kg. Salinity was between 18-20‰ (parts per thousand) in control measured every 7 days.

8. Mean measured temperature for each chamber at test termination should be within 1°C of selected test temperature. Each individual measured temperature must be within 3°C of the mean of the time-weighted averages. For mysid shrimp, 27°C is recommended. Whenever temp. is measured concurrently in more than one test chamber the highest & lowest temp. must not differ by more than 2°C. As the target temperature was reported to be 27 ± 2°C with a range of 26.1 to 29°C, it can not be determined if all the guideline criteria are met.

9. Meter systems should be calibrated before study and checked twice daily during test period, and renewal must not drop below 50% for more than 48 hours. However, actual exposure concentrations were collected and determined on days 0, 6, 13, 20, and 28.

10. According to guideline criteria the following solvents are acceptable: triethylene glycol, methanol, acetone, ethanol. DMF (Dimethylformamide) was used for this test.

11. According to guideline criteria the average number of young produced by the 1st generation females in the control(s) should be more than 3. The average number of live young produced in controls for first generation was 1.10 and 1.03 for the solvent control.
12. Individual dry weight measurements by sex should have been submitted. Only mean dry weight measurements were submitted.

10. **MATERIALS AND METHODS:**

A. **Biological System:**

<table>
<thead>
<tr>
<th>Guideline Criteria</th>
<th>Reported Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Species:</strong> An estuarine shrimp species, preferably <em>Americamysis bahia.</em></td>
<td>Test species was <em>Mysis (Mysidopsis bahia)</em></td>
</tr>
<tr>
<td><strong>Duration</strong> 28 days/one generation</td>
<td>28 days</td>
</tr>
<tr>
<td><strong>Source</strong> (or supplier)</td>
<td>Aquatic BioSystems, Inc., Fort Collins, CO</td>
</tr>
<tr>
<td><strong>Parental Acclimation</strong> 1) Parental stock must be maintained separately from the brood culture in dilution water and under test conditions. 2) Mysids should be in good health.</td>
<td>Salinity: 20-23‰  Temperature: 21.1-62°C  lighting: 16h/8h  Cultures were maintained separately and were in good health (no diseases were observed).</td>
</tr>
<tr>
<td><strong>Parental Acclimation Period</strong> At least 14 days</td>
<td>Acclimated for two week period prior to test initiation.</td>
</tr>
<tr>
<td><strong>Chamber Location:</strong> Treatments should be randomly assigned to test chamber locations.</td>
<td>Treatments were randomly assigned to test chamber locations.</td>
</tr>
<tr>
<td><strong>Duration of the Test:</strong> A mysid test must not be terminated before 7 days past the median time of 1st brood release in the control treatment.</td>
<td>1st brood released in control and solvent controls on days 12 and 13 respectively. The test duration was 28 days.</td>
</tr>
<tr>
<td>Guideline Criteria</td>
<td>Reported Information</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Brood Stock:</strong></td>
<td>Post-larval mysids from only one brood stock.</td>
</tr>
<tr>
<td>Test started with mysids:</td>
<td></td>
</tr>
<tr>
<td>1) from only one brood stock or</td>
<td></td>
</tr>
<tr>
<td>2) from brood stock which has not obtained sexual maturity or had been maintained for &gt; 14 days in a laboratory with same food, water, temperature, and salinity used in the test.</td>
<td></td>
</tr>
<tr>
<td><strong>Distribution:</strong></td>
<td></td>
</tr>
<tr>
<td>No. of mysids before pairing:</td>
<td></td>
</tr>
<tr>
<td>Minimum of 15 mysids per compartment, 2 compartments per chamber, 2 chambers per concentration for a total of 60/level.</td>
<td>Two replicates each containing 2 screened chambers with 10 mysids/chamber for a total of 40/level.</td>
</tr>
<tr>
<td>No. of mysids after pairing:</td>
<td></td>
</tr>
<tr>
<td>≥ 20 randomly selected pairs/treatment (excess males should be held in separate compartment to replace paired males).</td>
<td>20 offspring per replicate were transferred into additional retention chambers within the same test chamber.</td>
</tr>
<tr>
<td><strong>Pairing:</strong></td>
<td></td>
</tr>
<tr>
<td>1) Should be conducted when most of the mysids are sexually mature (usu. 10-14 days after test initiation).</td>
<td>Does not appear that adult mysids were separated into pairs.</td>
</tr>
<tr>
<td>2) Should be paired on the same day</td>
<td></td>
</tr>
<tr>
<td><strong>Feeding:</strong></td>
<td></td>
</tr>
<tr>
<td>1) Mysids should be fed live brine shrimp nauplii at least once daily.</td>
<td>Mysids fed live brine shrimp (Artemia salina) nauplii hatched daily from cysts at least once daily throughout test, generally fed 2-3 times/day.</td>
</tr>
<tr>
<td>2) 150 live brine shrimp nauplii per mysid per day or 75 twice a day is recommended.</td>
<td></td>
</tr>
</tbody>
</table>
### Guideline Criteria | Reported Information
--- | ---
Counts:  
Live adult mysids should be counted  
1) at initiation,  
2) at pairing,  
3) and daily after pairing.  
4) Live young must be counted and removed daily.  
5) Missing or impinged animals should be recorded.  | Live and dead were monitored daily throughout study according to guidance criteria.

Controls:  
Survival in any control chamber (between pairing and test termination) must not be less than 70%. | 83-94% control survival

Controls:  
Negative control and carrier control (when applicable) are required. | Solvent: Dimethylformamide (DMF)

**Comments:** None

**B. Physical System:**
<table>
<thead>
<tr>
<th><strong>Test Water:</strong></th>
<th><strong>Test Temperature:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1) May be natural (sterilized and filtered) or a commercial mixture; 2) During the test, difference between highest and lowest measured salinities must be less than 10 g/kg. Should be measured daily. 3) Salinity should be between 15 and 30 g/kg. 4) Measured pH should be between 7.6 and 8.2. Must not deviate by more than one unit for more than 48 hours. Should be measured at the beginning, end of test and weekly. 5) Water must be free of pollutants. 6) DO must be measured @ each conc. @ least once a wk. (see details in ASTM)</td>
<td>1) Filtered saltwater from shallow well, aerated, carbon-treated, and adjusted for salinity. 2&amp;3) Salinity between 18-20% in control measured every 7 days. 4) pH was 7.8 to 8.3. 5) Water was free of pollutants. 6) D.O. measured once per week in all test solutions</td>
</tr>
<tr>
<td><strong>Test Temperature:</strong></td>
<td><strong>Photoperiod:</strong> Recommend 16L/8D. 16 hours light, 8 hours dark.</td>
</tr>
<tr>
<td>1) Mean measured temperature for each chamber at test termination should be within ±1°C of selected test temperature. 2) Each individual measured temperature must be within ±3°C of the mean of the time-weighted averages. 3) For mysid shrimp, 27°C is recommended. 4) Whenever temp. is measured concurrently in more than one test chamber the highest &amp; lowest temp. must not differ by more than 2°C.</td>
<td>Water temperature in dilution water control was monitored and recorded hourly using a data logger and spot checked with a thermocouple thermometer daily. Water bath temperature was monitored continuously with a minimum/maximum thermometer and the diurnal temperature range recorded daily. Target: 27 ± 2°C Range: 26.1 to 29°C</td>
</tr>
<tr>
<td>Dosing Apparatus:</td>
<td>Continuous flow aerial dilutors were used on 5 test concentrations. The dilution factor was 50%. Controls were used.</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1) Intermittent flow proportional diluters or continuous flow serial diluters should be used. 2) A minimum of 5 toxicant concentrations 3) with a dilution factor not greater than 0.5 and controls should be used.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxicant Mixing:</th>
<th>Mixing chambers were used and aeration was not used for mixing. A total volume of 36.46 µL of the secondary stock solution was pumped into the 3710 ml chemical mixing chamber during each dilution cycle.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Mixing chamber is recommended but not required; 2) Aeration should not be used for mixing; 3) It must be demonstrated that the test solution is completely mixed before intro. into the test system; 4) Flow splitting accuracy must be within 10%.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Vessels:</th>
<th>24 liter glass tanks for the test chambers. Screened retention chambers were 142 mm diameter glass petri dish with a 17 cm high collar of 355 µm mesh nitex screen.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Material: all glass, No. 316 stainless steel, or perflorocarbon plastic  2) Size: 250 ml with 200 ml fill volume is preferred; 100 ml with 80 ml fill volume acceptable  3) 90 or 140 mm inside dia. glass Petri dish bottoms with collars made of 200 - 250 um mesh screen.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Covers</th>
<th>Screened retention chambers covered with 17 cm high collar of 355 µm mesh nitex screening.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Renewal: Test vessels should be covered with a glass plate. 2) Flow-through: Openings in the test compartments should be covered with nylon mesh or stainless steel screen.</td>
<td></td>
</tr>
</tbody>
</table>
### Flow Rate:
1) Flow rates should provide 5 to 10 volume additions per 24 hr.
2) Flow rate must maintain DO at or above 60% of saturation and maintain the toxicant level.
3) Meter systems calibrated before study and checked twice daily during test period
4) Renewal must not drop below 50% for more than 48 hours.

6.2 volume additions/24 hours. DO was maintained above 60% saturation at toxicant level. Actual exposure concentrations were collected and determined on days 0, 6, 13, 20, and 28.

### Aeration:
1) Dilution water should be aerated to insure DO concentration at or near 100% saturation.
2) Test tanks may be aerated.

Dilution water aerated by air stone and the test solutions were gently aerated to maintain d.o. concentrations.

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**Comments:**

C. **Chemical System:**

<table>
<thead>
<tr>
<th>Guideline Criteria</th>
<th>Reported Information</th>
</tr>
</thead>
</table>

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9
Concentrations:
1) Minimum of 5 concentrations and a control, all replicated, plus solvent control if appropriate.
2) Toxicant conc. must be measured in one tank at each toxicant level every week.
3) One concentration must adversely affect a life stage and one concentration must not affect any life stage.
4) The measured conc. of the test material of any treatment should be at least 50% of the time-weighted average measured conc. for >10% of the duration of the test.
5) The measured conc. for any treatment level should not be more than 30% higher than the time-weighted average measured conc. for more than 5% of the duration of the test.

Solvents:
1) Should not exceed 0.1 ml/L in a flow-through system.
2) Following solvents are acceptable: triethylene glycol, methanol, acetone, ethanol.

Solvent: Dimethylformamide (DMF)
Maximum conc.: 0.00983 ml/L.

Comments:

11. REPORTED RESULTS:

<table>
<thead>
<tr>
<th>Guideline Criteria</th>
<th>Reported Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality assurance and GLP compliance statements were included in the report?</td>
<td>Yes</td>
</tr>
<tr>
<td>Guideline Criteria</td>
<td>Reported Information</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1) At least 75% of the paired 1st generation females in the control produced young or</td>
<td>The average number of live young produced in controls for first generation was 1.10 and 1.03 for the solvent control.</td>
</tr>
<tr>
<td>2) the average number of young produced by the 1st generation females in the control(s) was more than 3.</td>
<td></td>
</tr>
<tr>
<td><strong>Data Endpoints</strong> must include:</td>
<td>1) Yes</td>
</tr>
<tr>
<td>1) Survival of first-generation mysids</td>
<td>2) Yes</td>
</tr>
<tr>
<td>Female</td>
<td>3) Individual dry weight measurements by sex were not submitted.</td>
</tr>
<tr>
<td>Male</td>
<td>4) Yes</td>
</tr>
<tr>
<td>2) Number of live young produced per female</td>
<td>5) Pathological or histological effects was not mentioned</td>
</tr>
<tr>
<td>3) Dry weight of each first-generation mysid alive at the end of the test</td>
<td>6) Observations and abnormalities in the behavior or physical appearance of time to first brood was recorded.</td>
</tr>
<tr>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>4) Length of each 1st generation mysid alive at the end of the study</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1) Data was included.</td>
</tr>
<tr>
<td>Male</td>
<td>2) Data was included.</td>
</tr>
<tr>
<td>5) Incidence of pathological or histological effects;</td>
<td>3) Data was included.</td>
</tr>
<tr>
<td>6) Observations of other effects or clinical signs.</td>
<td>4) Data for each sex was not included.</td>
</tr>
<tr>
<td><strong>Raw data included? (Y/N)</strong></td>
<td></td>
</tr>
<tr>
<td>At a minimum, individual data should be included for:</td>
<td></td>
</tr>
<tr>
<td>1) surviving 1st generation ♂ and ♀ mysids.</td>
<td>1) Data was included.</td>
</tr>
<tr>
<td>2) Number of live young produced per female.</td>
<td>2) Data was included.</td>
</tr>
<tr>
<td>3) Individual length measurements of ♂ and ♀ mysids.</td>
<td>3) Data was included.</td>
</tr>
<tr>
<td>4) Individual dry weight measurements for ♂ and ♀ mysids at the end of the test.</td>
<td>4) Data for each sex was not included.</td>
</tr>
</tbody>
</table>
## Effects Data:

<table>
<thead>
<tr>
<th>Toxicant Conc. (µg/L)¹</th>
<th>Mean # Young/fem. /repro. day²</th>
<th>Survival (28 days)</th>
<th>Mean Total (mm)</th>
<th>Length</th>
<th>Mean Dry weight (mg)³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>d</td>
<td>f</td>
<td>d &amp; f</td>
<td>d</td>
<td>f</td>
</tr>
<tr>
<td>Ctrl &lt;0.10 8</td>
<td>14</td>
<td>17</td>
<td>31</td>
<td>6.1</td>
<td>6.5</td>
</tr>
<tr>
<td>Sol &lt;0.10 8</td>
<td>15</td>
<td>24</td>
<td>39</td>
<td>5.9</td>
<td>6.3</td>
</tr>
<tr>
<td>0.25 0.172</td>
<td>12</td>
<td>22</td>
<td>34</td>
<td>6.1</td>
<td>6.9</td>
</tr>
<tr>
<td>0.50 0.385</td>
<td>15</td>
<td>17</td>
<td>32</td>
<td>6.0</td>
<td>6.3</td>
</tr>
<tr>
<td>1.0 0.970</td>
<td>14</td>
<td>18</td>
<td>32</td>
<td>6.1</td>
<td>6.2</td>
</tr>
<tr>
<td>2.0 1.89</td>
<td>13</td>
<td>19</td>
<td>32</td>
<td>6.2</td>
<td>6.4</td>
</tr>
<tr>
<td>4.0 3.86</td>
<td>9</td>
<td>5</td>
<td>14</td>
<td>6.3</td>
<td>6.3</td>
</tr>
</tbody>
</table>

¹ Measured concentration of PIRATE™ as ¹⁴C 303,630 equivalents.

² Calculated by dividing the cumulative number of young released by the number or reproductive days. For each female, the number of reproductive days is the number of days the female was alive from the day of first brood release by any female in the test to the end of the test. This corrects for varying number of reproductive days per treatment and female mortality.

³ The test assumed that the first young were produced in 12 days. However, data submitted shows that the observed length of time required for production of young varied from 12 days in control replicates to 23 days at the 3.86 µg/L level.

⁴ Individual growth data as dry weight by sex was not presented in this submission.

### Toxicity Observations:

### Statistical Results:

The following results were obtained by the authors.

**Most sensitive endpoint:** Survival was the most sensitive endpoint.
Comments: Control data were pooled because there was no significant difference between solvent and dilution water control. Statistical analysis for individual data by sex for length and dry weight was not performed.

12. Reviewer’s Statistical Results:

Most sensitive endpoint:

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Method</th>
<th>NOEC (µg/L)</th>
<th>LOEC (µg/L)</th>
<th>NAYC (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival</td>
<td>Fisher’s Exact Test</td>
<td>0.172</td>
<td>0.385</td>
<td>0.257</td>
</tr>
<tr>
<td>Reproduction</td>
<td>ANOVA</td>
<td>0.285</td>
<td>0.970</td>
<td>0.611</td>
</tr>
<tr>
<td>Weight</td>
<td>ANOVA</td>
<td>1.89</td>
<td>&gt;3.86</td>
<td>2.76</td>
</tr>
<tr>
<td>Length</td>
<td>ANOVA</td>
<td>&gt;3.86</td>
<td>&gt;3.86</td>
<td>&gt;3.86</td>
</tr>
</tbody>
</table>

Comments: Insufficient raw data was provided to run the test for survival. Specifically, the replicate data for first generation males was missing. In order to confirm the authors results this data must be submitted. Additionally, since individual data by sex for dry weight was not submitted statistical analysis could not be performed. Finally, as there was no significant difference between the solvent and dilution control groups, the dilution control was omitted from the analysis. However, the same results were obtained for reproduction, weight, and length of first generation mysids.
mysid chronic repro pooled
File: mysidrp  Transform: NO TRANSFORMATION

### t-test of Solvent and Blank Controls

<table>
<thead>
<tr>
<th></th>
<th>GRP1 (SOLVENT CRTL) MEAN</th>
<th>GRP2 (BLANK CRTL) MEAN</th>
<th>DIFFERENCE IN MEANS</th>
<th>CALCULATED t VALUE</th>
<th>DEGREES OF FREEDOM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.0275</td>
<td>1.0950</td>
<td>-0.0675</td>
<td>-0.2374</td>
<td>6</td>
</tr>
</tbody>
</table>

**TABLE t VALUE (0.05 (2), 6) = 2.447**  NO significant difference at alpha=0.05

**TABLE t VALUE (0.01 (2), 6) = 3.707**  NO significant difference at alpha=0.01

### ANOVA TABLE

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>5</td>
<td>2.486</td>
<td>0.497</td>
<td>3.601</td>
</tr>
<tr>
<td>Within (Error)</td>
<td>22</td>
<td>3.036</td>
<td>0.138</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>5.523</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Critical F value = 2.66 (0.05, 5, 22)

Since $F >$ Critical F REJECT Ho:All groups equal

### BONFERRONI T-TEST

**TABLE 1 OF 2**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>IDENTIFICATION</th>
<th>TRANSFORMED MEAN</th>
<th>MEAN CALCULATED IN ORIGINAL UNITS</th>
<th>T STAT</th>
<th>SIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GRPS 1&amp;2 POOLED</td>
<td>1.061</td>
<td>1.061</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.172</td>
<td>0.752</td>
<td>0.752</td>
<td>1.357</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.385</td>
<td>0.783</td>
<td>0.783</td>
<td>1.225</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.97</td>
<td>0.313</td>
<td>0.313</td>
<td>3.291</td>
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Bonferroni T table value = 2.51 (1 Tailed Value, P=0.05, df=22, 5)

mysid chronic repro pooled
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### BONFERRONI T-TEST

**TABLE 2 OF 2**

**Ho:Control<Treatment**
ANOVA TABLE

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Critical F value = 2.77 (0.05, 5, 18)
Since F > Critical F REJECT Ho:All groups equal

BONFERRONI T-TEST - TABLE 1 OF 2

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Bonferroni T table value = 2.55 (1 Tailed Value, P=0.05, df=18,5)

BONFERRONI T-TEST - TABLE 2 OF 2

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<th>DIFFERENCE FROM CONTROL</th>
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Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho: All groups equal

**BONFERRONI T-TEST**

**TABLE 1 OF 2**

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<th>GROUP</th>
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Bonferroni T table value = 2.55 (1 Tailed Value, P=0.05, df=18,5)

**BONFERRONI T-TEST**

**TABLE 2 OF 2**

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**mysid chronic length**

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Critical F value = 2.77 (0.05,5,18)
Since $F < $Critical F $FAIL TO REJECT$ $Ho:$All groups equal 

**BONFERRONI T-TEST**

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<tr>
<th>GROUP</th>
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Bonferroni T table value = 2.55 (1 Tailed Value, $P=0.05$, $df=18,5$).

**BONFERRONI T-TEST**

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Critical F value = 2.77 (0.05, 5, 18)  
Since F < Critical F FAIL TO REJECT Ho: All groups equal

**BONFERRONI T-TEST**  
**TABLE 1 OF 2**  
Ho: Control < Treatment

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Bonferroni T table value = 2.55  
(1 Tailed Value, P=0.05, df=18, 5)

**BONFERRONI T-TEST**  
**TABLE 2 OF 2**  
Ho: Control < Treatment

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Critical F value = 2.77 \( (0.05, 5, 18) \)
Since \( F > \) Critical F REJECT Ho: All groups equal

### BONFERRONI T-TEST - TABLE 1 OF 2

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<tr>
<th>GROUP</th>
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Bonferroni T table value = 2.55 (1 Tailed Value, \( P=0.05 \), \( df=18, 5 \))

### BONFERRONI T-TEST - TABLE 2 OF 2

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*/
title2 ' ';
proc npar1way wilcoxon data=trout;
class trtmnt;
var weight;
quit;