MRID No. 444575-01

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

1. **CHEMICAL**: Ethoprop   PC Code No.: 041101

2. **TEST MATERIAL**: Ethoprop Technical   Purity: 96.8%

3. **CITATION**:

             Authors: Joseph V. Sousa
                Title: Ethoprop Technical - Chronic Toxicity to
                      Mysids (*Mysidopsis bahia*) Under Flow-
                      Through Conditions
    Study Completion Date: December 11, 1997
           Laboratory: Springborn Laboratories, Inc., Wareham,
                      MA
             Sponsor: Rhone-Poulec Ag Company, Research
                      Triangle Park, NC
    Laboratory Report ID: 97-10-7128
                 MRID No.: 444575-01
              DP Barcode: D242881

4. **REVIEWED BY**: Karl Bullock, M.S., Environmental Scientist,
                     Golder Associates Inc.

    Signature: *Karl Bullock*   Date: 3/18/98

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

    Signature: *P. Kosalwat*   Date: 3/18/98

5. **APPROVED BY**:

    Signature: Date: 3/20/98

6. **STUDY PARAMETERS**:

           Age of Test Organism: ≤24 hours
          Definitive Test Duration: 28 days
                  Study Method: Flow-Through
         Type of Concentrations: Mean Measured

7. **CONCLUSIONS**: This study is scientifically sound and fulfills
    the guideline requirements for an estuarine invertebrate life
    cycle test using mysids. Based on the most sensitive
    endpoints (male length and dry weight), the LOEC and NOEC for
    mysids exposed to Ethoprop Technical were 2.7 and 1.4 ppb ai,
    respectively. The geometric-mean MATC was 1.9 ppb ai.

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Results Synopsis

<u>Most sensitive endpoint</u>: Growth (male length and dry weight)

NOEC: 1.4 ppb ai
LOEC: 2.7 ppb ai
MATC: 1.9 ppb ai

<u>LOEC's for specific effects</u>

Young/Female
Reproductive Day: 5.1 ppb ai
Survival: >5.1 ppb ai
Male length: 2.7 ppb ai
Female length: 5.1 ppb ai
Male dry weight: 2.7 ppb ai
Female dry weight: 5.1 ppb ai

8. <u>ADEQUACY OF THE STUDY</u>:

   A. **Classification:** Core.

   B. **Rationale:** Fulfills the guideline requirements.

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

9. <u>MAJOR GUIDELINE DEVIATIONS</u>: Since there is no EPA SEP for a
    mysid life cycle toxicity test, ASTM's Standard Guide for
    Conducting Life-Cycle Toxicity Tests with Saltwater Mysids
    (E1191-90) was used as a guidance for this data evaluation.
    No deviations from ASTM's guidelines were noted.

10. <u>MATERIALS AND METHODS</u>:

   A. <u>Biological System</u>:

Guideline Criteria	Reported Information
Species: An estuarine shrimp species, preferably *Mysidopsis bahia*	*Mysidopsis bahia*
Duration 28 days/one generation	28 days
Source (or supplier)	In-house cultures

Guideline Criteria	Reported Information
Parental Acclimation 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.	1. Parental stock was maintained in the dilution water at test temperature. 2. Yes
Parental Acclimation Period At least 14 days	$\geq$14 days
Chamber Location: Treatments should be randomly assigned to test chamber locations.	Yes
Duration of the Test: A mysid test must not be terminated before 7 days past the median time of 1st brood release in the control treatment.	Test was conducted for 28 days. Time to sexual maturation of surviving mysids was reported to be 14 days.
Brood Stock: Test started with mysids: 1) from only one brood stock or 2) from brood stock which has not obtain sexual maturity or had been maintained for > 14 days in a laboratory with same food, water, temperature, and salinity used in the test.	Mysids were obtained from in-house cultures maintained for at least 14 days, in dilution water at test temperature.

Guideline Criteria	Reported Information
Distribution: **No. of mysids before pairing:** Minimum of 15 mysids per compartment, 2 compartments per chamber, 2 chambers per concentration for a total of 60/level. **No. of mysids after pairing:** ≥ 20 randomly selected pairs/treatment (excess males should be held in separate compartment to replace paired males).	**Before pairing:** 15 mysids/compartment; 2 compartments/test chamber; 2 replicate chambers/ treatment (60 mysids/level). **After pairing:** Up to 10 pairs/replicate chamber (20 pairs/treatment). The remaining mysids were held in one of the original retention chambers within each aquarium.
Pairing: 1) Should be conducted when most of the mysids are sexually mature (usually 10-14 days after test initiation). 2) Should be paired on the same day.	1. Pairing was conducted when the mysids reached sexual maturation. 2. Mysids were paired in the control and all treatments on Day 14.
Feeding: 1) Mysids should be fed live brine shrimp nauplii at least once daily. 2) 150 live brine shrimp nauplii per mysid per day or 75 twice a day is recommended.	1. Mysids were fed live *Artemia salina* nauplii *ad libitum* two times daily during the test, except during the final 24 hours of the test. Feedings were supplemented with Selco® (saturated fatty acids) prior to pairing and every other day during the reproductive phase. 2. Not reported.

Guideline Criteria	Reported Information
Counts: Live adult mysids should be counted at test initiation, at pairing, and daily after pairing. Live young must be counted and removed daily. Missing or impinged animals should be recorded.	Number of surviving mysids were counted at test initiation and at 24 hour intervals. Live young were counted and removed daily beginning on Day 15 (the first day that young were present). Dead mysids were removed when observed. No occurrence of sublethal effects on behavior or appearance were noted.
Controls: Survival in any control chamber (between pairing and test termination) must not be less than 70%.	88% survival in the dilution water control based on total number of mysids exposed.
Controls: Negative control and carrier control (when applicable) are required.	A dilution water control was used.

B. Physical System:

Guideline Criteria	Reported Information
Test Water: 1) May be natural (sterilized and filtered) or a commercial mixture with a salinity between 15 and 30 g/kg, and free of pollutants. 2) During the test, salinity should be measured daily and the difference between highest and lowest must be less than 10 g/kg. 3) pH should be measured at the beginning, end of test and weekly. Measured values should be between 7.6 and 8.2, and not deviate by more than one unit for more than 48 hours. 4) DO must be measured at each conc. at least once a week. (see details in ASTM)	1. Artificial seawater prepared daily by the addition of a commercially prepared salt formula (hw-MARINEMIX®) to soft freshwater, filtered through a 10-μm filter and adjusted to a salinity of 25 ± 3‰. The artificial seawater was mixed and aerated vigorously and screened for contaminants. 2. Salinity measured daily in each replicate was between 23 and 27‰ during the test. 3. pH measured daily in each replicate was between 8.0 and 8.3 during the test. 4. DO measured daily in each replicate was maintained at $\geq$84% of saturation throughout the test.
Test Temperature: 1) Mean measured temperature for each chamber at test termination should be within 1°C of selected test temperature. For mysid shrimp, 27°C is recommended. 2) Each individual measured temperature must be within 3°C of the mean of the time-weighted averages. 3) Whenever temperature is measured concurrently in more than one test chamber the highest & lowest temp. must not differ by more than 2°C.	1) Mean measured temperature for each chamber at test termination was 25°C, equal to the selected test temperature. 2) Continuous temperature monitoring in replicate B of the control ranged from 22-27°C; daily temperature measurements in all other replicates ranged from 23-26°C. Individual daily temperature values were not provided in the raw data. 3) According to the summary of daily measurements, the highest and lowest temperature did not differ more than 2°C.

Guideline Criteria	Reported Information
Photoperiod: Recommend 16L/8D.	16-hour light/8-hour dark
Dosing Apparatus: Intermittent flow proportional diluters or continuous flow serial diluters with a dilution factor not greater than 0.5 (a minimum of 5 toxicant concentrations and a control).	Intermittent-flow proportional diluter with a dilution factor of approximately 0.5.
Toxicant Mixing: 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%.	1. A mixing chamber was used. 2. A water-driven magnetic stir plate was used for mixing. 3. Chemical analysis of test solutions resulted in mean recoveries of Ethoprop Technical ranging from 92 - 150% of nominal concentrations. 4. Not reported.
Test Vessels: 1) Material: all glass, No. 316 stainless steel, or perfluorocarbon plastic. 2) Size: 250 ml with 200 ml fill volume is preferred; 100 ml with 80 ml fill volume acceptable. 3) Test compartments: 90 or 140 mm inside diameter glass Petri dish bottoms with collars made of 200-250 μm mesh screen.	1. Glass 2. 39 X 20 X 25 cm with a solution volume fluctuating between 4 and 7 L. 3. Retention chambers were 10-cm dia. glass petri dishes with 15-cm high Nitex® screen collars. Pairing chambers were glass jars (5.1-cm dia., 10-cm high) containing two 2-cm holes covered with 363-μm Nitex® screen.

Guideline Criteria	Reported Information
Covers 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.	1. N/A 2. Test compartments had Nitex® screen collars.
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.	1. 7.2 volume additions/24 hours 2. DO maintained at $\geq 84\%$ of saturation. Toxicant concentration was maintained between 92 and 150% of nominal concentrations. 3. Yes
Aeration: 1) Dilution water should be aerated to insure DO concentration at or near 100% saturation. 2) Test tanks may be aerated.	1. Dilution water was aerated prior to use. 2. No aeration was necessary in the test vessels.

C. **Chemical System:**

Guideline Criteria	Reported Information
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 concentration 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.	1. Dilution water control, 0.17, 0.34, 0.69, 1.4, 2.7, and 5.5 μg ai/L 2. Toxicant concentrations were measured in both replicates of each treatment on Days 0, 7, 14, 21, 23, and 28. 3. LOEC and NOEC were obtained 4. Measured concentrations appeared consistent throughout the test period. 5. See above.
Solvents: 1) Should not exceed 0.1 ml/L in a flow-through system. 2) Following solvents are acceptable: triethylene glycol, methanol, acetone, ethanol.	1. No solvent was used. 2. N/A

Comments: None.

11. REPORTED RESULTS:

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
1) At least 75% of the paired 1st generation females in the control produced young or 2) The average number of young produced by the 1st generation females in the control(s) was more than 3.	1. Yes 2. Average of 13.6 offspring/female in the dilution water (1.0 offspring per female reproductive day).
Data Endpoints must include: · Survival of first-generation mysids (female and male), · Number of live young produced per female, · Dry weight and length of each first-generation mysid alive at the end of the test (female and male), · Incidence of pathological or histological effects, and observations of other effects or clinical signs.	Data include: · Survival of first-generation mysids (female and male combined) · Number of young produced per female reproductive day. · Dry weight and total length of each first-generation male and female survivor. · None noted.
Raw data included? (Y/N)	Yes

Effects Data:

Toxicant Concentration (μg ai/l)		No. of Young per female repro. day	Survival	Mean Total Length (mm)		Mean Dry Weight (mg)	
Nom.	Meas.		♂ & ♀[a]	♂	♀	♂	♀
Control	<0.045	1.0	88	7.7	7.6	0.98	1.2
0.17	0.25	1.3	85	7.6	7.7	0.97	1.2
0.34	0.40	1.6	83	7.8	8.0	0.98	1.4
0.69	0.65	1.4	93	7.6	7.7	0.98	1.3
1.4	1.4	1.4	83	7.6	7.8	0.92	1.3
2.7	2.7	1.2	93	7.2[b]	7.6	0.88[b]	1.2
5.5	5.1	0.29[b]	65	7.1[b]	7.3[b]	0.78[b]	0.87[b]

[a] Represents survival of all first generation mysids (i.e., those paired for spawning and those maintained as extras).

[b] Significantly reduced when compared to the control ($p < 0.05$).

Toxicity Observations: No sublethal signs of toxicity were reported.

Statistical Results:

Endpoint	Method	NOEC (μg ai/L)	LOEC (μg ai/L)
Survival	Williams' Test	5.1	>5.1
Reproduction	Williams' Test	2.7	5.1
Male Length	Williams' Test	1.4	2.7
Female Length	Williams' Test	5.1	>5.1
Male Dry Weight	Williams' Test	1.4	2.7
Female Dry Weight	Williams' Test	2.7	5.1

Comments: For analysis of growth data, the authors used mean values rather than individual measurements. Percent survival data were arcsine square-root transformed prior to analysis. Analyses compared treatment and control means.

12. REVIEWER'S STATISTICAL RESULTS:

Endpoint	Method	NOEC (ppb ai)	LOEC (ppb ai)
Survival	Williams'	5.1	>5.1
# Young/female	Williams'	2.7	5.1
Male Length	Dunnett's	1.4	2.7
Female Length	Dunnett's	2.7	5.1
Male Dry Weight	Dunnett's	1.4	2.7
Female Dry Weight	Dunnett's	2.7	5.1

Comments: The reviewer used individual measurements in the analysis of growth data. Percent survival data were arcsine square-root transformed prior to analysis.

13. REVIEWER'S CONCLUSIONS:
This study is scientifically sound and fulfills the guideline requirements for an invertebrate life cycle test. Based on mean measured concentrations and the most sensitive endpoints (male length and dry weight), the NOEC and LOEC were 1.4 and 2.7 ppb ai, respectively. The geometric-mean MATC was 1.9 ppb ai. The study is classified as **Core**.

Ethoprop Technical: Mysid Life Cycle - survival
File: 44457501   Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST   (Isotonic regression model)   TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Control	2	0.880	1.224	1.236
2	0.25	2	0.850	1.235	1.236
3	0.4	2	0.835	1.155	1.236
4	0.65	2	0.935	1.323	1.236
5	1.4	2	0.835	1.155	1.236
6	2.7	2	0.935	1.323	1.236
7	5.1	2	0.650	0.939	0.939

Ethoprop Technical: Mysid Life Cycle - survival
File: 44457501   Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST   (Isotonic regression model)   TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Control	1.236				
0.25	1.236	0.073		1.89	k= 1, v= 7
0.4	1.236	0.073		2.00	k= 2, v= 7
0.65	1.236	0.073		2.04	k= 3, v= 7
1.4	1.236	0.073		2.06	k= 4, v= 7
2.7	1.236	0.073		2.07	k= 5, v= 7
5.1	0.939	1.846		2.08	k= 6, v= 7

s =   0.155
Note: df used for table values are approximate when v > 20.

Ethoprop: Mysid Life Cycle - young/fem. repro. day
File: 44457501   Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model)   TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Control	2	1.040	1.040	1.328
2	0.25	2	1.250	1.250	1.328
3	0.4	2	1.550	1.550	1.328
4	0.65	2	1.400	1.400	1.328
5	1.4	2	1.400	1.400	1.328
6	2.7	2	1.200	1.200	1.200
7	5.1	2	0.305	0.305	0.305

Ethoprop: Mysid Life Cycle - young/fem. repro. day
File: 44457501   Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model)   TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Control	1.328				
0.25	1.328	1.110		1.89	k= 1, v= 7
0.4	1.328	1.110		2.00	k= 2, v= 7
0.65	1.328	1.110		2.04	k= 3, v= 7
1.4	1.328	1.110		2.06	k= 4, v= 7
2.7	1.200	0.617		2.07	k= 5, v= 7
5.1	0.305	2.833	*	2.08	k= 6, v= 7

s =   0.259
Note: df used for table values are approximate when v > 20.

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------------------------------ TRT=Control ------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	31	7.6516129	0.3501152	6.9000000	8.5000000
FLNGTH	22	7.5772727	0.3517735	6.9000000	8.2000000
MDWT	31	0.9761290	0.1380019	0.7500000	1.3300000
FDWT	22	1.1913636	0.1451533	0.8900000	1.4800000

------------------------------ TRT=I ------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	23	7.5652174	0.4270498	6.9000000	8.4000000
FLNGTH	28	7.6714286	0.4462661	6.5000000	8.4000000
MDWT	22	0.9700000	0.1163329	0.8000000	1.2600000
FDWT	28	1.2257143	0.2159977	0.6000000	1.6700000

------------------------------ TRT=II ------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	23	7.7956522	0.3169145	7.2000000	8.3000000
FLNGTH	27	7.9666667	0.3269909	7.4000000	8.5000000
MDWT	23	0.9756522	0.1015707	0.8000000	1.1600000
FDWT	27	1.3855556	0.1809236	1.0300000	1.6200000

------------------------------ TRT=III ------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	29	7.6241379	0.3987975	7.0000000	8.2000000
FLNGTH	27	7.7296296	0.3417318	6.7000000	8.3000000
MDWT	29	0.9779310	0.1253674	0.7400000	1.2000000
FDWT	27	1.2911111	0.2107374	0.8700000	1.7200000

------------------------------ TRT=IV ------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	21	7.6476190	0.2960051	7.0000000	8.1000000
FLNGTH	29	7.8000000	0.3703280	7.0000000	8.5000000
MDWT	21	0.9214286	0.0854568	0.7800000	1.0900000
FDWT	29	1.2748276	0.2620063	0.6900000	1.8100000

------------------------------ TRT=V ------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	30	7.1800000	0.3726883	6.5000000	7.8000000
FLNGTH	26	7.6346154	0.3474965	6.9000000	8.5000000
MDWT	30	0.8826667	0.1005822	0.6700000	1.1000000
FDWT	26	1.2484615	0.2165676	0.7400000	1.6400000

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------------------------------ TRT=VI ------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	14	7.0571429	0.3588749	6.4000000	7.8000000
FLNGTH	25	7.3000000	0.3291403	6.7000000	8.0000000
MDWT	14	0.7842857	0.0972478	0.6200000	0.9500000
FDWT	25	0.8740000	0.1505822	0.6200000	1.1900000

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General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRT	7	Control I II III IV V VI
REP	2	A B

Number of observations in data set = 200

Group	Obs	Dependent Variables
1	171	MLNGTH
2	184	FLNGTH FDWT
3	170	MDWT

NOTE: Variables in each group are consistent with respect to the
presence or absence of missing values.

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General Linear Models Procedure

Dependent Variable: MLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	9.5608692	1.3658385	10.26	0.0001
Error	163	21.7001834	0.1331300		
Corrected Total	170	31.2610526			

R-Square	C.V.	Root MSE	MLNGTH Mean
0.305840	4.850181	0.3649	7.5228

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	9.4541240	1.5756873	11.84	0.0001
REP	1	0.1067452	0.1067452	0.80	0.3719

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	9.5367255	1.5894542	11.94	0.0001
REP	1	0.1067452	0.1067452	0.80	0.3719

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General Linear Models Procedure
Least Squares Means

TRT	MLNGTH LSMEAN	LSMEAN Number
Control	7.64916935	1
I	7.56851088	2
II	7.79235868	3
III	7.62500862	4
IV	7.65363097	5
V	7.17831666	6
VI	7.04992855	7

Pr > |T| HO: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.4239	0.1558	0.7982	0.9657	0.0001	0.0001
2	0.4239	.	0.0395	0.5801	0.4409	0.0002	0.0001
3	0.1558	0.0395	.	0.1027	0.2116	0.0001	0.0001
4	0.7982	0.5801	0.1027	.	0.7849	0.0001	0.0001
5	0.9657	0.4409	0.2116	0.7849	.	0.0001	0.0001
6	0.0001	0.0002	0.0001	0.0001	0.0001	.	0.2792
7	0.0001	0.0001	0.0001	0.0001	0.0001	0.2792	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

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General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: MLNGTH

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 163 MSE= 0.13313
Critical Value of T= 3.08644

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
II - Control	-0.16588	0.14404	0.45396	
II - IV	-0.19186	0.14803	0.48793	
II - III	-0.14292	0.17151	0.48595	
II - I	-0.10165	0.23043	0.56252	
II - V	0.30354	0.61565	0.92776	***
II - VI	0.35677	0.73851	1.12025	***
Control - II	-0.45396	-0.14404	0.16588	
Control - IV	-0.31428	0.00399	0.32227	
Control - III	-0.26346	0.02747	0.31841	
Control - I	-0.22352	0.08640	0.39631	
Control - V	0.18320	0.47161	0.76003	***
Control - VI	0.23185	0.59447	0.95709	***

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
IV - II	-0.48793	-0.14803	0.19186	
IV - Control	-0.32227	-0.00399	0.31428	
IV - III	-0.29920	0.02348	0.34616	
IV - I	-0.25750	0.08240	0.42230	
IV - V	0.14721	0.46762	0.78803	***
IV - VI	0.20192	0.59048	0.97903	***
III - II	-0.48595	-0.17151	0.14292	
III - Control	-0.31841	-0.02747	0.26346	
III - IV	-0.34616	-0.02348	0.29920	
III - I	-0.25552	0.05892	0.37336	
III - V	0.15087	0.44414	0.73740	***
III - VI	0.20050	0.56700	0.93349	***
I - II	-0.56252	-0.23043	0.10165	
I - Control	-0.39631	-0.08640	0.22352	
I - IV	-0.42230	-0.08240	0.25750	
I - III	-0.37336	-0.05892	0.25552	
I - V	0.07311	0.38522	0.69733	***
I - VI	0.12633	0.50807	0.88981	***
V - II	-0.92776	-0.61565	-0.30354	***
V - Control	-0.76003	-0.47161	-0.18320	***
V - IV	-0.78803	-0.46762	-0.14721	***
V - III	-0.73740	-0.44414	-0.15087	***
V - I	-0.69733	-0.38522	-0.07311	***
V - VI	-0.24164	0.12286	0.48736	
VI - II	-1.12025	-0.73851	-0.35677	***
VI - Control	-0.95709	-0.59447	-0.23185	***
VI - IV	-0.97903	-0.59048	-0.20192	***
VI - III	-0.93349	-0.56700	-0.20050	***
VI - I	-0.88981	-0.50807	-0.12633	***

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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
VI - V	-0.48736	-0.12286	0.24164

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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: MLNGTH

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 163 MSE= 0.13313
Critical Value of Dunnett's T= 2.338

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
II - Control	-0.09070	0.14404	0.37878
IV - Control	-0.24507	-0.00399	0.23708

III	- Control	-0.24784	-0.02747	0.19289	
I	- Control	-0.32114	-0.08640	0.14835	
V	- Control	-0.69007	-0.47161	-0.25316	***
VI	- Control	-0.86913	-0.59447	-0.31981	***

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General Linear Models Procedure

Dependent Variable: FLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	6.9686252	0.9955179	7.66	0.0001
Error	176	22.8808857	0.1300050		
Corrected Total	183	29.8495109			

R-Square	C.V.	Root MSE	FLNGTH Mean
0.233459	4.696880	0.3606	7.6766

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	6.5985892	1.0997649	8.46	0.0001
REP	1	0.3700360	0.3700360	2.85	0.0934

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	6.5425953	1.0904326	8.39	0.0001
REP	1	0.3700360	0.3700360	2.85	0.0934

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General Linear Models Procedure

Dependent Variable: FDWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	4.0042926	0.5720418	13.72	0.0001
Error	176	7.3382378	0.0416945		
Corrected Total	183	11.3425304			

R-Square	C.V.	Root MSE	FDWT Mean
0.353033	16.76696	0.2042	1.2178

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	3.9957897	0.6659649	15.97	0.0001
REP	1	0.0085029	0.0085029	0.20	0.6521

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	4.0014407	0.6669068	16.00	0.0001
REP	1	0.0085029	0.0085029	0.20	0.6521

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General Linear Models Procedure
Least Squares Means

TRT	FLNGTH LSMEAN	LSMEAN Number
Control	7.57727273	1
I	7.68109102	2
II	7.96833672	3
III	7.72461947	4
IV	7.79533537	5
V	7.63461538	6
VI	7.30180366	7

Pr > |T| H0: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.3143	0.0002	0.1567	0.0339	0.5837	0.0097
2	0.3143	.	0.0036	0.6563	0.2352	0.6372	0.0002
3	0.0002	0.0036	.	0.0140	0.0747	0.0009	0.0001
4	0.1567	0.6563	0.0140	.	0.4643	0.3651	0.0001
5	0.0339	0.2352	0.0747	0.4643	.	0.1008	0.0001
6	0.5837	0.6372	0.0009	0.3651	0.1008	.	0.0012
7	0.0097	0.0002	0.0001	0.0001	0.0001	0.0012	.

TRT	FDWT LSMEAN	LSMEAN Number
Control	1.19136364	1
I	1.22424959	2
II	1.38530240	3
III	1.29187059	4
IV	1.27553468	5
V	1.24846154	6
VI	0.87372659	7

Pr > |T| H0: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.5732	0.0011	0.0885	0.1468	0.3357	0.0001
2	0.5732	.	0.0039	0.2230	0.3463	0.6644	0.0001
3	0.0011	0.0039	.	0.0948	0.0461	0.0157	0.0001
4	0.0885	0.2230	0.0948	.	0.7652	0.4404	0.0001
5	0.1468	0.3463	0.0461	0.7652	.	0.6242	0.0001
6	0.3357	0.6644	0.0157	0.4404	0.6242	.	0.0001
7	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Ethoprop Technical Mysid Life Cycle
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General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: FLNGTH

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 176 MSE= 0.130005
Critical Value of T= 3.08282

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
II - IV	-0.13060	0.16667	0.46393	
II - III	-0.06549	0.23704	0.53956	
II - I	-0.00457	0.29524	0.59505	
II - V	0.02663	0.33205	0.63747	***
II - Control	0.07014	0.38939	0.70865	***
II - VI	0.35815	0.66667	0.97518	***
IV - II	-0.46393	-0.16667	0.13060	
IV - III	-0.22689	0.07037	0.36763	
IV - I	-0.16593	0.12857	0.42307	
IV - V	-0.13482	0.16538	0.46559	
IV - Control	-0.09154	0.22273	0.53700	
IV - VI	0.19664	0.50000	0.80336	***
III - II	-0.53956	-0.23704	0.06549	
III - IV	-0.36763	-0.07037	0.22689	
III - I	-0.24161	0.05820	0.35801	
III - V	-0.21041	0.09501	0.40043	
III - Control	-0.16689	0.15236	0.47161	
III - VI	0.12111	0.42963	0.73815	***
I - II	-0.59505	-0.29524	0.00457	
I - IV	-0.42307	-0.12857	0.16593	
I - III	-0.35801	-0.05820	0.24161	
I - V	-0.26592	0.03681	0.33955	
I - Control	-0.22253	0.09416	0.41084	
I - VI	0.06557	0.37143	0.67728	***
V - II	-0.63747	-0.33205	-0.02663	***
V - IV	-0.46559	-0.16538	0.13482	
V - III	-0.40043	-0.09501	0.21041	
V - I	-0.33955	-0.03681	0.26592	
V - Control	-0.26465	0.05734	0.37934	
V - VI	0.02326	0.33462	0.64597	***
Control - II	-0.70865	-0.38939	-0.07014	***
Control - IV	-0.53700	-0.22273	0.09154	
Control - III	-0.47161	-0.15236	0.16689	
Control - I	-0.41084	-0.09416	0.22253	
Control - V	-0.37934	-0.05734	0.26465	
Control - VI	-0.04766	0.27727	0.60221	
VI - II	-0.97518	-0.66667	-0.35815	***
VI - IV	-0.80336	-0.50000	-0.19664	***
VI - III	-0.73815	-0.42963	-0.12111	***
VI - I	-0.67728	-0.37143	-0.06557	***
VI - V	-0.64597	-0.33462	-0.02326	***

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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
VI - Control	-0.60221	-0.27727	0.04766

(handwritten: treatment II > control)

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General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: FDWT

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 176 MSE= 0.041695
Critical Value of T= 3.08282

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
II - III	-0.07688	0.09444	0.26577	
II - IV	-0.05762	0.11073	0.27907	
II - V	-0.03587	0.13709	0.31006	
II - I	-0.00995	0.15984	0.32963	
II - Control	0.01339	0.19419	0.37499	***
II - VI	0.33684	0.51156	0.68627	***
III - II	-0.26577	-0.09444	0.07688	
III - IV	-0.15206	0.01628	0.18463	
III - V	-0.13031	0.04265	0.21561	
III - I	-0.10439	0.06540	0.23519	
III - Control	-0.08105	0.09975	0.28054	
III - VI	0.24239	0.41711	0.59183	***
IV - II	-0.27907	-0.11073	0.05762	
IV - III	-0.18463	-0.01628	0.15206	
IV - V	-0.14365	0.02637	0.19638	
IV - I	-0.11767	0.04911	0.21589	
IV - Control	-0.09451	0.08346	0.26144	
IV - VI	0.22903	0.40083	0.57262	***
V - II	-0.31006	-0.13709	0.03587	
V - III	-0.21561	-0.04265	0.13031	
V - IV	-0.19638	-0.02637	0.14365	
V - I	-0.14870	0.02275	0.19419	
V - Control	-0.12525	0.05710	0.23945	
V - VI	0.19814	0.37446	0.55079	***
I - II	-0.32963	-0.15984	0.00995	
I - III	-0.23519	-0.06540	0.10439	
I - IV	-0.21589	-0.04911	0.11767	
I - V	-0.19419	-0.02275	0.14870	
I - Control	-0.14499	0.03435	0.21369	
I - VI	0.17850	0.35171	0.52493	***
Control - II	-0.37499	-0.19419	-0.01339	***
Control - III	-0.28054	-0.09975	0.08105	
Control - IV	-0.26144	-0.08346	0.09451	
Control - V	-0.23945	-0.05710	0.12525	
Control - I	-0.21369	-0.03435	0.14499	
Control - VI	0.13335	0.31736	0.50138	***
VI - II	-0.68627	-0.51156	-0.33684	***
VI - III	-0.59183	-0.41711	-0.24239	***
VI - IV	-0.57262	-0.40083	-0.22903	***
VI - V	-0.55079	-0.37446	-0.19814	***
VI - I	-0.52493	-0.35171	-0.17850	***

(handwritten: treatment II > control)

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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
VI - Control	-0.50138	-0.31736	-0.13335	***

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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: FLNGTH

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 176 MSE= 0.130005
Critical Value of Dunnett's T= 2.289

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
II - Control	0.15233	0.38939	0.62646	
IV - Control	-0.01064	0.22273	0.45609	
III - Control	-0.08471	0.15236	0.38942	
I - Control	-0.14100	0.09416	0.32931	
V - Control	-0.18176	0.05734	0.29644	
VI - Control	-0.51856	-0.27727	-0.03599	***

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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: FDWT

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 176 MSE= 0.041695
Critical Value of Dunnett's T= 2.289

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
II - Control	0.05994	0.19419	0.32845	
III - Control	-0.03451	0.09975	0.23400	
IV - Control	-0.04869	0.08346	0.21562	
V - Control	-0.07831	0.05710	0.19251	
I - Control	-0.09882	0.03435	0.16752	
VI - Control	-0.45401	-0.31736	-0.18072	***

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General Linear Models Procedure

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.5791074	0.0827296	6.44	0.0001
Error	162	2.0803449	0.0128416		
Corrected Total	169	2.6594524			

R-Square	C.V.	Root MSE	MDWT Mean
0.217754	12.10009	0.1133	0.9365

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	0.5744891	0.0957482	7.46	0.0001
REP	1	0.0046183	0.0046183	0.36	0.5495

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	0.5783281	0.0963880	7.51	0.0001
REP	1	0.0046183	0.0046183	0.36	0.5495

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General Linear Models Procedure
Least Squares Means

TRT	MDWT LSMEAN	LSMEAN Number
Control	0.97561956	1
I	0.97047859	2
II	0.97496550	3
III	0.97811257	4
IV	0.92268203	5
V	0.88231570	6
VI	0.78278157	7

Pr > |T| H0: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.8711	0.9833	0.9323	0.1017	0.0016	0.0001
2	0.8711	.	0.8947	0.8120	0.1690	0.0063	0.0001
3	0.9833	0.8947	.	0.9210	0.1300	0.0037	0.0001
4	0.9323	0.8120	0.9210	.	0.0902	0.0014	0.0001
5	0.1017	0.1690	0.1300	0.0902	.	0.2139	0.0005
6	0.0016	0.0063	0.0037	0.0014	0.2139	.	0.0075
7	0.0001	0.0001	0.0001	0.0001	0.0005	0.0075	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Ethoprop Technical Mysid Life Cycle
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General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: MDWT

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 162 MSE= 0.012842
Critical Value of T= 3.08674

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
III - Control	-0.08856	0.00180	0.09217	
III - II	-0.09539	0.00228	0.09995	
III - I	-0.09097	0.00793	0.10683	
III - IV	-0.04372	0.05650	0.15673	
III - V	0.00417	0.09526	0.18636	***
III - VI	0.07981	0.19365	0.30748	***
Control - III	-0.09217	-0.00180	0.08856	
Control - II	-0.09579	0.00048	0.09674	
Control - I	-0.09138	0.00613	0.10364	
Control - IV	-0.04416	0.05470	0.15356	
Control - V	0.00388	0.09346	0.18305	***
Control - VI	0.07921	0.19184	0.30448	***
II - III	-0.09995	-0.00228	0.09539	
II - Control	-0.09674	-0.00048	0.09579	
II - I	-0.09866	0.00565	0.10997	
II - IV	-0.05135	0.05422	0.15980	
II - V	-0.00396	0.09299	0.18993	
II - VI	0.07279	0.19137	0.30994	***
I - III	-0.10683	-0.00793	0.09097	
I - Control	-0.10364	-0.00613	0.09138	
I - II	-0.10997	-0.00565	0.09866	
I - IV	-0.05814	0.04857	0.15529	
I - V	-0.01085	0.08733	0.18552	
I - VI	0.06613	0.18571	0.30530	***
IV - III	-0.15673	-0.05650	0.04372	
IV - Control	-0.15356	-0.05470	0.04416	
IV - II	-0.15980	-0.05422	0.05135	
IV - I	-0.15529	-0.04857	0.05814	
IV - V	-0.06076	0.03876	0.13829	
IV - VI	0.01645	0.13714	0.25783	***
V - III	-0.18636	-0.09526	-0.00417	***
V - Control	-0.18305	-0.09346	-0.00388	***
V - II	-0.18993	-0.09299	0.00396	
V - I	-0.18552	-0.08733	0.01085	
V - IV	-0.13829	-0.03876	0.06076	
V - VI	-0.01484	0.09838	0.21160	
VI - III	-0.30748	-0.19365	-0.07981	***
VI - Control	-0.30448	-0.19184	-0.07921	***
VI - II	-0.30994	-0.19137	-0.07279	***
VI - I	-0.30530	-0.18571	-0.06613	***
VI - IV	-0.25783	-0.13714	-0.01645	***

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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
VI - V	-0.21160	-0.09838	0.01484

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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: MDWT

NOTE: This tests controls the type I experimentwise error for
comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 162 MSE= 0.012842
Critical Value of Dunnett's T= 2.338

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
III - Control	-0.06666	0.00180	0.07026	
II - Control	-0.07340	-0.00048	0.07245	
I - Control	-0.08000	-0.00613	0.06774	
IV - Control	-0.12960	-0.05470	0.02019	
V - Control	-0.16133	-0.09346	-0.02559	***
VI - Control	-0.27717	-0.19184	-0.10651	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure
Class Level Information

Class	Levels	Values
REP	2	A B
TRT	7	Control I II III IV V VI

Number of observations in data set = 200

Group	Obs	Dependent Variables
1	171	MLNGTH
2	184	FLNGTH FDWT
3	170	MDWT

NOTE: Variables in each group are consistent with respect to the
presence or absence of missing values.

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dependent Variable: MLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	11.756996	0.904384	7.28	0.0001

Error	157	19.504056	0.124230
Corrected Total	170	31.261053	

R-Square	C.V.	Root MSE	MLNGTH Mean
0.376091	4.685249	0.3525	7.5228

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.0241438	0.0241438	0.19	0.6599
TRT	6	9.5367255	1.5894542	12.79	0.0001
REP*TRT	6	2.1961272	0.3660212	2.95	0.0094

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.0944327	0.0944327	0.76	0.3846
TRT	6	9.1035023	1.5172504	12.21	0.0001
REP*TRT	6	2.1961272	0.3660212	2.95	0.0094

Tests of Hypotheses using the Type III MS for REP*TRT as an error term

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	9.1035023	1.5172504	4.15	0.0537

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure
Least Squares Means

Standard Errors and Probabilities calculated using the Type III MS for REP*TRT as an Error term

TRT	MLNGTH LSMEAN	LSMEAN Number
Control	7.64705882	1
I	7.60269231	2
II	7.80653846	3
III	7.62452381	4
IV	7.65528846	5
V	7.18482143	6
VI	7.07111111	7

Pr > |T| HO: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.8002	0.3782	0.8904	0.9639	0.0249	0.0286
2	0.8002	.	0.3005	0.9019	0.7871	0.0480	0.0456
3	0.3782	0.3005	.	0.3249	0.4476	0.0103	0.0131
4	0.8904	0.9019	0.3249	.	0.8673	0.0317	0.0342
5	0.9639	0.7871	0.4476	0.8673	.	0.0364	0.0358
6	0.0249	0.0480	0.0103	0.0317	0.0364	.	0.5935
7	0.0286	0.0456	0.0131	0.0342	0.0358	0.5935	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: MLNGTH

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 6 MSE= 0.366021
Critical Value of Dunnett's T= 2.974

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
II - Control	-0.3511	0.1440	0.6392	
IV - Control	-0.5125	-0.0040	0.5046	
III - Control	-0.4923	-0.0275	0.4374	
I - Control	-0.5816	-0.0864	0.4088	
V - Control	-0.9324	-0.4716	-0.0108	***
VI - Control	-1.1739	-0.5945	-0.0151	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dependent Variable: FLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	9.2038684	0.7079899	5.83	0.0001
Error	170	20.6456425	0.1214450		
Corrected Total	183	29.8495109			

R-Square	C.V.	Root MSE	FLNGTH Mean
0.308342	4.539616	0.3485	7.6766

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.4260298	0.4260298	3.51	0.0628
TRT	6	6.5425953	1.0904326	8.98	0.0001
REP*TRT	6	2.2352432	0.3725405	3.07	0.0071

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.3955110	0.3955110	3.26	0.0729
TRT	6	6.5736155	1.0956026	9.02	0.0001
REP*TRT	6	2.2352432	0.3725405	3.07	0.0071

Tests of Hypotheses using the Type III MS for REP*TRT as an error term

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	6.5736155	1.0956026	2.94	0.1075

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dependent Variable: FDWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F

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Model	13	4.7539954	0.3656920	9.44	0.0001
Error	170	6.5885350	0.0387561		
Corrected Total	183	11.3425304			

	R-Square	C.V.	Root MSE	FDWT Mean
	0.419130	16.16533	0.1969	1.2178

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.0028519	0.0028519	0.07	0.7865
TRT	6	4.0014407	0.6669068	17.21	0.0001
REP*TRT	6	0.7497028	0.1249505	3.22	0.0050

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	-0.0034393	0.0034393	0.09	0.7661
TRT	6	4.0447713	0.6741286	17.39	0.0001
REP*TRT	6	0.7497028	0.1249505	3.22	0.0050

Tests of Hypotheses using the Type III MS for REP*TRT as an error term

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	4.0447713	0.6741286	5.40	0.0298

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure
Least Squares Means

Standard Errors and Probabilities calculated using the Type III MS for REP*TRT as an Error term

TRT	FLNGTH LSMEAN	LSMEAN Number
Control	7.57727273	1
I	7.72459893	2
II	7.96675824	3
III	7.74083333	4
IV	7.79423077	5
V	7.63461538	6
VI	7.30288462	7

Pr > |T| HO: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.4339	0.0681	0.3881	0.2564	0.7567	0.1751
2	0.4339	.	0.1963	0.9258	0.6861	0.6118	0.0477
3	0.0681	0.1963	.	0.2241	0.3325	0.0950	0.0078
4	0.3881	0.9258	0.2241	.	0.7560	0.5511	0.0420
5	0.2564	0.6861	0.3325	0.7560	.	0.3714	0.0259
6	0.7567	0.6118	0.0950	0.5511	0.3714	.	0.1005
7	0.1751	0.0477	0.0078	0.0420	0.0259	0.1005	.

Standard Errors and Probabilities calculated using the Type III MS for REP*TRT as an Error term

TRT	FDWT LSMEAN	LSMEAN Number
Control	1.19136364	1

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I	1.24042781	2
II	1.38521978	3
III	1.30525000	4
IV	1.27783654	5
V	1.24846154	6
VI	0.87506410	7

Pr > |T| HO: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.6468	0.1049	0.3061	0.4212	0.5973	0.0222
2	0.6468	.	0.1842	0.5278	0.7075	0.9369	0.0099
3	0.1049	0.1842	.	0.4392	0.3006	0.2089	0.0020
4	0.3061	0.5278	0.4392	.	0.7828	0.5812	0.0047
5	0.4212	0.7075	0.3006	0.7828	.	0.7693	0.0059
6	0.5973	0.9369	0.2089	0.5812	0.7693	.	0.0093
7	0.0222	0.0099	0.0020	0.0047	0.0059	0.0093	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: FLNGTH

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 6 MSE= 0.372541
Critical Value of Dunnett's T= 2.881

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
II - Control	-0.1156	0.3894	0.8944
IV - Control	-0.2744	0.2227	0.7199
III - Control	-0.3527	0.1524	0.6574
I - Control	-0.4068	0.0942	0.5951
V - Control	-0.4520	0.0573	0.5667
VI - Control	-0.7913	-0.2773	0.2367

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: FDWT

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 6 MSE= 0.12495
Critical Value of Dunnett's T= 2.881

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit

II	- Control	-0.09829	0.19419	0.48667	
III	- Control	-0.19273	0.09975	0.39223	
IV	- Control	-0.20445	0.08346	0.37138	
V	- Control	-0.23790	0.05710	0.35209	
I	- Control	-0.25577	0.03435	0.32447	
VI	- Control	-0.61505	-0.31736	-0.01968	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dependent Variable: MDWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	0.7391411	0.0568570	4.62	0.0001
Error	156	1.9203113	0.0123097		
Corrected Total	169	2.6594524			

R-Square	C.V.	Root MSE	MDWT Mean
0.277930	11.84683	0.1109	0.9365

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.0007793	0.0007793	0.06	0.8017
TRT	6	0.5783281	0.0963880	7.83	0.0001
REP*TRT	6	0.1600337	0.0266723	2.17	0.0490

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.0091223	0.0091223	0.74	0.3906
TRT	6	0.5327207	0.0887868	7.21	0.0001
REP*TRT	6	0.1600337	0.0266723	2.17	0.0490

Tests of Hypotheses using the Type III MS for REP*TRT as an error term

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	0.5327207	0.0887868	3.33	0.0845

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure
Least Squares Means

Standard Errors and Probabilities calculated using the Type III MS for
REP*TRT as an Error term

TRT	MDWT LSMEAN	LSMEAN Number
Control	0.97281513	1
I	0.97266667	2
II	0.97246154	3
III	0.97626190	4
IV	0.92812500	5
V	0.88401786	6
VI	0.78244444	7

Pr > |T| HO: LSMEAN(i)=LSMEAN(j)

i/j	1	2	3	4	5	6	7
1	.	0.9975	0.9940	0.9377	0.3790	0.0788	0.0127
2	0.9975	.	0.9968	0.9406	0.4133	0.1022	0.0161
3	0.9940	0.9968	.	0.9366	0.4117	0.1001	0.0158
4	0.9377	0.9406	0.9366	.	0.3511	0.0735	0.0122
5	0.3790	0.4133	0.4117	0.3511	.	0.3873	0.0471
6	0.0788	0.1022	0.1001	0.0735	0.3873	.	0.1115
7	0.0127	0.0161	0.0158	0.0122	0.0471	0.1115	.

NOTE: To ensure overall protection level, only probabilities associated
with pre-planned comparisons should be used.

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
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General Linear Models Procedure

Dunnett's One-tailed T tests for variable: MDWT

NOTE: This tests controls the type I experimentwise error for
comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 6 MSE= 0.026672
Critical Value of Dunnett's T= 2.975

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison		Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
III	- Control	-0.12373	0.00180	0.12734	
II	- Control	-0.13420	-0.00048	0.13325	
I	- Control	-0.14159	-0.00613	0.12933	
IV	- Control	-0.19203	-0.05470	0.08263	
V	- Control	-0.21791	-0.09346	0.03099	
VI	- Control	-0.34831	-0.19184	-0.03537	***