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1-EEB-06C
6/17/97

MRID NO. 442437-01

DATA EVALUATION RECORD
FISH LIFE-CYCLE TOXICITY TEST
GUIDELINE 72-5

1. **CHEMICAL:** Dithiopyr — PC Code No.: 128994

2. **TEST MATERIAL:** Dithiopyr Technical — Purity: 94.54%

3. **CITATION:**

Author:	Emily Dionne
Title:	Dithiopyr Technical - The Chronic Toxicity to the Fathead Minnow (*Pimephales promelas*) During a Full Life-cycle exposure
Study Completion Date:	February 14, 1997
Laboratory:	Springborn Laboratories, Inc., Wareham, MA
Laboratory Report ID:	96-11-6788
Sponsor:	Rohm and Haas Company, Spring House, PA
MRID No.:	442437-01
DP Barcode:	D234838

4. **REVIEWED BY:** Max Feken, M.S., Environmental Toxicologist, KBN Engineering and Applied Sciences, Inc.

Signature: **Date:** 6/6/97

APPROVED BY: Mark Mossler, M.S., Toxicologist, KBN Engineering and Applied Sciences, Inc.

Signature: **Date:** 6/6/97

5. **APPROVED BY:**

Signature: Contractor draft version **Date:**

6. **Study Parameters:**

Test Species:	*Pimephales promelas*
Age of Test Organism:	<24 hours old embryos
Test Duration:	272 days
Study Method:	Flow-Through
Type of Concentrations:	Mean measured

7. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements for a fish full life-cycle toxicity test using fathead minnows.

2049808

DITHIOPYR TECHNICAL - F0 30-DAY SURVIVAL
File: 4424371S 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	SOLVENT	2	0.900	1.255	1.264
2	CONTROL	2	0.900	1.251	1.264
3	0.011	2	0.900	1.251	1.264
4	0.020	2	0.910	1.270	1.264
5	0.039	2	0.920	1.293	1.264
6	0.078	2	0.820	1.133	1.133
7	0.16	2	0.290	0.567	0.567

DITHIOPYR TECHNICAL - F0 30-DAY SURVIVAL
File: 4424371S 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
SOLVENT	1.264				
CONTROL	1.264	0.117		1.89	k= 1, v= 7
0.011	1.264	0.117		2.00	k= 2, v= 7
0.020	1.264	0.117		2.04	k= 3, v= 7
0.039	1.264	0.117		2.06	k= 4, v= 7
0.078	1.133	1.646		2.07	k= 5, v= 7
0.16	0.567	9.278	*	2.08	k= 6, v= 7

s = 0.074
Note: df used for table values are approximate when v > 20.

DITHIOPYR TECHNICAL - F0 59-DAY SURVIVAL
File: 4424372S 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	SOLVENT	2	0.900	1.255	1.255
2	CONTROL	2	0.890	1.233	1.252
3	0.011	2	0.890	1.233	1.252
4	0.020	2	0.910	1.270	1.252
5	0.039	2	0.910	1.270	1.252
6	0.078	2	0.810	1.120	1.120
7	0.16	2	0.260	0.534	0.534

DITHIOPYR TECHNICAL - F0 59-DAY SURVIVAL
File: 4424372S 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
SOLVENT	1.255				
CONTROL	1.252	0.061		1.89	k= 1, v= 7
0.011	1.252	0.061		2.00	k= 2, v= 7
0.020	1.252	0.061		2.04	k= 3, v= 7
0.039	1.252	0.061		2.06	k= 4, v= 7
0.078	1.120	2.220	*	2.07	k= 5, v= 7
0.16	0.534	11.828	*	2.08	k= 6, v= 7

s = 0.061
Note: df used for table values are approximate when v > 20.

DITHIOPYR TECHNICAL - NUMBER EGGS/SPAWN
File: 44243701 Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	SOLVENT	2	168.500	168.500	173.083
2	CONTROL	2	158.500	158.500	173.083
3	0.011	2	155.500	155.500	173.083
4	0.020	2	182.000	182.000	173.083
5	0.039	2	190.000	190.000	173.083
6	0.078	2	184.000	184.000	173.083
7	0.16	2	146.500	146.500	146.500

DITHIOPYR TECHNICAL - NUMBER EGGS/SPAWN
File: 44243701 Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
SOLVENT	173.083				
CONTROL	173.083	0.133		1.89	k= 1, v= 7
0.011	173.083	0.133		2.00	k= 2, v= 7
0.020	173.083	0.133		2.04	k= 3, v= 7
0.039	173.083	0.133		2.06	k= 4, v= 7
0.078	173.083	0.133		2.07	k= 5, v= 7
0.16	146.500	0.639		2.08	k= 6, v= 7

s = 34.447
Note: df used for table values are approximate when v > 20.

DITHIOPYR TECHNICAL - SPAWNS/FEMALE
File: 44243701 Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	SOLVENT	2	11.600	11.600	11.600
2	CONTROL	2	9.800	9.800	9.800
3	0.011	2	9.600	9.600	9.600
4	0.020	2	8.250	8.250	8.300
5	0.039	2	8.350	8.350	8.300
6	0.078	2	6.100	6.100	6.100
7	0.16	2	5.050	5.050	5.050

DITHIOPYR TECHNICAL - SPAWNS/FEMALE
File: 44243701 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
SOLVENT	11.600				
CONTROL	9.800	0.675		1.89	k= 1, v= 7
0.011	9.600	0.750		2.00	k= 2, v= 7
0.020	8.300	1.238		2.04	k= 3, v= 7
0.039	8.300	1.238		2.06	k= 4, v= 7
0.078	6.100	2.063		2.07	k= 5, v= 7
0.16	5.050	2.457	*	2.08	k= 6, v= 7

s = 2.666
Note: df used for table values are approximate when v > 20.

DITHIOPYR TECHNICAL - NUMBER EGGS/FEMALE
File: 442437EG Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	SOLVENT	2	1954.500	1954.500	1954.500
2	CONTROL	2	1598.500	1598.500	1598.500
3	0.011	2	1513.500	1513.500	1545.500
4	0.020	2	1554.000	1554.000	1545.500
5	0.039	2	1569.000	1569.000	1545.500
6	0.078	2	1122.000	1122.000	1122.000
7	0.16	2	737.500	737.500	737.500

DITHIOPYR TECHNICAL - NUMBER EGGS/FEMALE
File: 442437EG Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
SOLVENT	1954.500				
CONTROL	1598.500	0.570		1.89	k= 1, v= 7
0.011	1545.500	0.654		2.00	k= 2, v= 7
0.020	1545.500	0.654		2.04	k= 3, v= 7
0.039	1545.500	0.654		2.06	k= 4, v= 7
0.078	1122.000	1.332		2.07	k= 5, v= 7
0.16	737.500	1.947		2.08	k= 6, v= 7

s = 624.956
Note: df used for table values are approximate when v > 20.

DITHIOPYR TECHNICAL - F1 30-DAY SURVIVAL
File: 442437F1 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	SOLVENT	2	0.940	1.324	1.335
2	CONTROL	2	0.850	1.211	1.335
3	0.011	2	0.990	1.471	1.335
4	0.020	2	0.830	1.150	1.218
5	0.039	2	0.880	1.246	1.218
6	0.078	2	0.900	1.259	1.218
7	0.16	2	0.860	1.191	1.191

DITHIOPYR TECHNICAL - F1 30-DAY SURVIVAL
File: 442437F1 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
SOLVENT	1.335				
CONTROL	1.335	0.076		1.89	k= 1, v= 7
0.011	1.335	0.076		2.00	k= 2, v= 7
0.020	1.218	0.732		2.04	k= 3, v= 7
0.039	1.218	0.732		2.06	k= 4, v= 7
0.078	1.218	0.732		2.07	k= 5, v= 7
0.16	1.191	0.922		2.08	k= 6, v= 7

s = 0.145
Note: df used for table values are approximate when v > 20.

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length at 30 days
10:24 Tuesday, June 3, 1997

Analysis Variable : LENGTH

TRT=CONT

N	Mean	Std Dev	Minimum	Maximum
85	30.1647059	3.5718711	10.0000000	37.0000000

TRT=SOLV

N	Mean	Std Dev	Minimum	Maximum
86	30.8139535	2.8347077	23.0000000	40.0000000

TRT=TRTI

N	Mean	Std Dev	Minimum	Maximum
84	30.5714286	2.2617070	22.0000000	36.0000000

TRT=TRTII

N	Mean	Std Dev	Minimum	Maximum
87	30.1264368	2.3566067	24.0000000	36.0000000

TRT=TRTIII

N	Mean	Std Dev	Minimum	Maximum
85	29.7294118	3.0213062	21.0000000	38.0000000

TRT=TRTIV

N	Mean	Std Dev	Minimum	Maximum
78	28.9743590	3.3689736	13.0000000	38.0000000

TRT=TRTV

N	Mean	Std Dev	Minimum	Maximum
29	25.5172414	2.7982225	19.0000000	30.0000000

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRT	7	CONT SOLV TRTI TRTII TRTIII TRTIV TRTV
REP	2	A B

Number of observations in data set = 534

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Dependent Variable: LENGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	788.87341	112.69620	13.26	0.0001
Error	526	4471.95805	8.50182		
Corrected Total	533	5260.83146			

R-Square	C.V.	Root MSE	LENGTH Mean
0.149952	9.774206	2.9158	29.831

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	743.96690	123.99448	14.58	0.0001
REP	1	44.90652	44.90652	5.28	0.0219

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	757.55110	126.25852	14.85	0.0001
REP	1	44.90652	44.90652	5.28	0.0219

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure
Least Squares Means

TRT	LENGTH LSMEAN	LSMEAN Number
CONT	30.1681230	1
SOLV	30.8274631	2
TRTI	30.5783442	3
TRTII	30.1364525	4
TRTIII	29.7123261	5
TRTIV	28.9892542	6
TRTV	25.4671627	7

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

i/j	1	2	3	4	5	6	7
1	.	0.1399	0.3609	0.9433	0.3087	0.0102	0.0001
2	0.1399	.	0.5778	0.1197	0.0127	0.0001	0.0001
3	0.3609	0.5778	.	0.3223	0.0541	0.0006	0.0001
4	0.9433	0.1197	0.3223	.	0.3408	0.0119	0.0001
5	0.3087	0.0127	0.0541	0.3408	.	0.1145	0.0001

6	0.0102	0.0001	0.0006	0.0119	0.1145	.	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.

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: LENGTH

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= 526 MSE= 8.501821
Critical Value of T= 3.05291

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
SOLV - TRTI	-1.1230	0.2425	1.6081	
SOLV - CONT	-0.7122	0.6492	2.0107	
SOLV - TRTII	-0.6661	0.6875	2.0411	
SOLV - TRTIII	-0.2769	1.0845	2.4460	
SOLV - TRTIV	0.4477	1.8396	3.2315	***
SOLV - TRTV	3.3852	5.2967	7.2082	***
TRTI - SOLV	-1.6081	-0.2425	1.1230	
TRTI - CONT	-0.9628	0.4067	1.7762	
TRTI - TRTII	-0.9167	0.4450	1.8067	
TRTI - TRTIII	-0.5275	0.8420	2.2115	
TRTI - TRTIV	0.1974	1.5971	2.9968	***
TRTI - TRTV	3.1370	5.0542	6.9714	***
CONT - SOLV	-2.0107	-0.6492	0.7122	
CONT - TRTI	-1.7762	-0.4067	0.9628	
CONT - TRTII	-1.3193	0.0383	1.3958	
CONT - TRTIII	-0.9302	0.4353	1.8007	
CONT - TRTIV	-0.2054	1.1903	2.5861	
CONT - TRTV	2.7331	4.6475	6.5618	***
TRTII - SOLV	-2.0411	-0.6875	0.6661	
TRTII - TRTI	-1.8067	-0.4450	0.9167	
TRTII - CONT	-1.3958	-0.0383	1.3193	
TRTII - TRTIII	-0.9606	0.3970	1.7546	
TRTII - TRTIV	-0.2360	1.1521	2.5401	
TRTII - TRTV	2.7005	4.6092	6.5179	***
TRTIII - SOLV	-2.4460	-1.0845	0.2769	
TRTIII - TRTI	-2.2115	-0.8420	0.5275	
TRTIII - CONT	-1.8007	-0.4353	0.9302	
TRTIII - TRTII	-1.7546	-0.3970	0.9606	
TRTIII - TRTIV	-0.6407	0.7551	2.1508	
TRTIII - TRTV	2.2979	4.2122	6.1265	***
TRTIV - SOLV	-3.2315	-1.8396	-0.4477	***
TRTIV - TRTI	-2.9968	-1.5971	-0.1974	***
TRTIV - CONT	-2.5861	-1.1903	0.2054	
TRTIV - TRTII	-2.5401	-1.1521	0.2360	
TRTIV - TRTIII	-2.1508	-0.7551	0.6407	

TRTIV - TRTV	1.5211	3.4571	5.3932	***
TRTV - SOLV	-7.2082	-5.2967	-3.3852	***
TRTV - TRTI	-6.9714	-5.0542	-3.1370	***
TRTV - CONT	-6.5618	-4.6475	-2.7331	***
TRTV - TRTII	-6.5179	-4.6092	-2.7005	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTV - TRTIII	-6.1265	-4.2122	-2.2979	***
TRTV - TRTIV	-5.3932	-3.4571	-1.5211	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 526 MSE= 8.501821
Critical Value of Dunnett's T= 2.315

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - SOLV	-1.2779	-0.2425	0.7928	
CONT - SOLV	-1.6815	-0.6492	0.3830	
TRTII - SOLV	-1.7138	-0.6875	0.3388	
TRTIII - SOLV	-2.1168	-1.0845	-0.0523	***
TRTIV - SOLV	-2.8949	-1.8396	-0.7843	***
TRTV - SOLV	-6.7460	-5.2967	-3.8474	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure
Class Level Information

Class	Levels	Values
REP	2	A B
TRT	7	CONT SOLV TRTI TRTII TRTIII TRTIV TRTV

Number of observations in data set = 534

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length at 30 days

General Linear Models Procedure

Dependent Variable: LENGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	915.41503	70.41654	8.43	0.0001
Error	520	4345.41643	8.35657		
Corrected Total	533	5260.83146			

R-Square	C.V.	Root MSE	LENGTH Mean
0.174006	9.690351	2.8908	29.831

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	31.32231	31.32231	3.75	0.0534
TRT	6	757.55110	126.25852	15.11	0.0001
REP*TRT	6	126.54162	21.09027	2.52	0.0204

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	43.07718	43.07718	5.15	0.0236
TRT	6	745.25065	124.20844	14.86	0.0001
REP*TRT	6	126.54162	21.09027	2.52	0.0204

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	745.25065	124.20844	5.89	0.0243

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length at 30 days
10:24 Tuesday, June 3, 1997

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	LENGTH LSMEAN	LSMEAN Number
CONT	30.1780177	1
SOLV	30.8319783	2
TRTI	30.5592740	3
TRTII	30.1277778	4
TRTIII	29.7208333	5
TRTIV	29.0006592	6
TRTV	25.4411765	7

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

i/j	1	2	3	4	5	6	7
1	.	0.3880	0.6090	0.9452	0.5407	0.1534	0.0032
2	0.3880	.	0.7122	0.3526	0.1653	0.0437	0.0017
3	0.6090	0.7122	.	0.5618	0.2806	0.0744	0.0022
4	0.9452	0.3526	0.5618	.	0.5828	0.1669	0.0033
5	0.5407	0.1653	0.2806	0.5828	.	0.3565	0.0052
6	0.1534	0.0437	0.0744	0.1669	0.3565	.	0.0125
7	0.0032	0.0017	0.0022	0.0033	0.0052	0.0125	.

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
Total Length at 30 days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

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

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= 21.09027
Critical Value of Dunnett's T= 2.956

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - SOLV	-2.3247	-0.2425	1.8396	
CONT - SOLV	-2.7252	-0.6492	1.4267	
TRTII - SOLV	-2.7514	-0.6875	1.3764	
TRTIII - SOLV	-3.1605	-1.0845	0.9914	
TRTIV - SOLV	-3.9619	-1.8396	0.2827	
TRTV - SOLV	-8.2113	-5.2967	-2.3821	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

TRT=CONT

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	39	43.8392308	3.6798665	35.0100000	51.4600000
WEIGHT	39	0.8222359	0.2351908	0.4196000	1.4002000

TRT=SOLV

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	40	42.8742500	4.1382022	26.5600000	48.9400000
WEIGHT	40	0.7684300	0.2040122	0.1565000	1.2154000

TRT=TRTI

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	39	43.6776923	3.0263261	36.0200000	50.1500000
WEIGHT	39	0.8204513	0.2025583	0.3842000	1.2938000

TRT=TRTII

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	41	42.4456098	3.1463193	34.7900000	49.4600000
WEIGHT	41	0.7578439	0.1855782	0.3840000	1.1960000

TRT=TRTIII

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	40	42.0250000	2.8075877	35.9100000	46.9500000
WEIGHT	40	0.7359100	0.1641245	0.4292000	1.0942000

TRT=TRTIV

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	31	41.4406452	3.6579456	34.3900000	50.5800000
WEIGHT	31	0.7448194	0.2414038	0.3779000	1.4443000

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRT	6	CONT SOLV TRTI TRTII TRTIII TRTIV
REP	2	A B

Number of observations in data set = 230

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Dependent Variable: LENGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	199.18901	33.19817	2.85	0.0107
Error	223	2594.49881	11.63452		
Corrected Total	229	2793.68782			

R-Square	C.V.	Root MSE	LENGTH Mean
0.071300	7.977545	3.4109	42.757

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	158.41188	31.68238	2.72	0.0207
REP	1	40.77714	40.77714	3.50	0.0625

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	5	161.18532	32.23706	2.77	0.0189
REP	1	40.77714	40.77714	3.50	0.0625

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Dependent Variable: WEIGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.4431090	0.0738515	1.77	0.1057
Error	223	9.2882227	0.0416512		
Corrected Total	229	9.7313317			

R-Square	C.V.	Root MSE	WEIGHT Mean
0.045534	26.31166	0.2041	0.7756

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	0.2706402	0.0541280	1.30	0.2651
REP	1	0.1724688	0.1724688	4.14	0.0430

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	5	0.2787708	0.0557542	1.34	0.2489
REP	1	0.1724688	0.1724688	4.14	0.0430

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE

* Treatment V was not analyzed since No fish were removed and measured.

Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure
Least Squares Means

TRT	LENGTH LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4	5	6
CONT	43.8500532	1	.	0.2253	0.8345	0.0732	0.0158	0.0039
SOLV	42.9164574	2	0.2253	.	0.3157	0.5622	0.2230	0.0746
TRTI	43.6885147	3	0.8345	0.3157	.	0.1136	0.0274	0.0070
TRTII	42.4764932	4	0.0732	0.5622	0.1136	.	0.5161	0.2093
TRTIII	41.9827926	5	0.0158	0.2230	0.0274	0.5161	.	0.5182
TRTIV	41.4542604	6	0.0039	0.0746	0.0070	0.2093	0.5182	.

TRT	WEIGHT LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4	5	6
CONT	0.82293973	1	.	0.2610	0.9692	0.1684	0.0520	0.1172
SOLV	0.77117496	2	0.2610	.	0.2778	0.8031	0.4066	0.6026
TRTI	0.82115512	3	0.9692	0.2778	.	0.1807	0.0568	0.1259
TRTII	0.75985241	4	0.1684	0.8031	0.1807	.	0.5574	0.7711
TRTIII	0.73316504	5	0.0520	0.4066	0.0568	0.5574	.	0.7977
TRTIV	0.74570482	6	0.1172	0.6026	0.1259	0.7711	0.7977	.

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

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: LENGTH

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= 223 MSE= 11.63452
Critical Value of T= 2.96716

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONT - TRTI	-2.1304	0.1615	2.4534
CONT - SOLV	-1.3126	0.9650	3.2425
CONT - TRTII	-0.8702	1.3936	3.6574
CONT - TRTIII	-0.4633	1.8142	4.0918
CONT - TRTIV	-0.0367	2.3986	4.8339
TRTI - CONT	-2.4534	-0.1615	2.1304
TRTI - SOLV	-1.4741	0.8034	3.0810
TRTI - TRTII	-1.0317	1.2321	3.4959
TRTI - TRTIII	-0.6248	1.6527	3.9302
TRTI - TRTIV	-0.1982	2.2370	4.6723
SOLV - CONT	-3.2425	-0.9650	1.3126
SOLV - TRTI	-3.0810	-0.8034	1.4741
SOLV - TRTII	-1.8206	0.4286	2.6779
SOLV - TRTIII	-1.4138	0.8492	3.1123

SOLV - TRTIV	-0.9882	1.4336	3.8554
TRTII - CONT	-3.6574	-1.3936	0.8702
TRTII - TRTI	-3.4959	-1.2321	1.0317
TRTII - SOLV	-2.6779	-0.4286	1.8206
TRTII - TRTIII	-1.8286	0.4206	2.6698
TRTII - TRTIV	-1.4039	1.0050	3.4138
TRTIII - CONT	-4.0918	-1.8142	0.4633
TRTIII - TRTI	-3.9302	-1.6527	0.6248
TRTIII - SOLV	-3.1123	-0.8492	1.4138
TRTIII - TRTII	-2.6698	-0.4206	1.8286
TRTIII - TRTIV	-1.8374	0.5844	3.0061
TRTIV - CONT	-4.8339	-2.3986	0.0367
TRTIV - TRTI	-4.6723	-2.2370	0.1982
TRTIV - SOLV	-3.8554	-1.4336	0.9882
TRTIV - TRTII	-3.4138	-1.0050	1.4039
TRTIV - TRTIII	-3.0061	-0.5844	1.8374

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: WEIGHT

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= 223 MSE= 0.041651
Critical Value of T= 2.96716

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONT - TRTI	-0.13535	0.00178	0.13892
CONT - SOLV	-0.08247	0.05381	0.19008
CONT - TRTII	-0.07106	0.06439	0.19984
CONT - TRTIV	-0.06829	0.07742	0.22313
CONT - TRTIII	-0.04995	0.08633	0.22260
TRTI - CONT	-0.13892	-0.00178	0.13535
TRTI - SOLV	-0.08425	0.05202	0.18829
TRTI - TRTII	-0.07284	0.06261	0.19806
TRTI - TRTIV	-0.07008	0.07563	0.22134
TRTI - TRTIII	-0.05173	0.08454	0.22081
SOLV - CONT	-0.19008	-0.05381	0.08247
SOLV - TRTI	-0.18829	-0.05202	0.08425
SOLV - TRTII	-0.12399	0.01059	0.14516
SOLV - TRTIV	-0.12129	0.02361	0.16851
SOLV - TRTIII	-0.10289	0.03252	0.16793
TRTII - CONT	-0.19984	-0.06439	0.07106
TRTII - TRTI	-0.19806	-0.06261	0.07284
TRTII - SOLV	-0.14516	-0.01059	0.12399
TRTII - TRTIV	-0.13110	0.01302	0.15715
TRTII - TRTIII	-0.11264	0.02193	0.15651
TRTIV - CONT	-0.22313	-0.07742	0.06829
TRTIV - TRTI	-0.22134	-0.07563	0.07008

TRTIV - SOLV	-0.16851	-0.02361	0.12129
TRTIV - TRTII	-0.15715	-0.01302	0.13110
TRTIV - TRTIII	-0.13599	0.00891	0.15381
TRTIII - CONT	-0.22260	-0.08633	0.04995
TRTIII - TRTI	-0.22081	-0.08454	0.05173
TRTIII - SOLV	-0.16793	-0.03252	0.10289
TRTIII - TRTII	-0.15651	-0.02193	0.11264
TRTIII - TRTIV	-0.15381	-0.00891	0.13599

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 223 MSE= 11.63452
Critical Value of Dunnett's T= 2.252

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONT - SOLV	-0.7634	0.9650	2.6933
TRTI - SOLV	-0.9249	0.8034	2.5318
TRTII - SOLV	-2.1355	-0.4286	1.2782
TRTIII - SOLV	-2.5666	-0.8492	0.8681
TRTIV - SOLV	-3.2714	-1.4336	0.4042

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 59 Days (from fish that were removed)
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General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 223 MSE= 0.041651
Critical Value of Dunnett's T= 2.252

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONT - SOLV	-0.04961	0.05381	0.15722
TRTI - SOLV	-0.05139	0.05202	0.15543
TRTII - SOLV	-0.11271	-0.01059	0.09154
TRTIV - SOLV	-0.13357	-0.02361	0.08635
TRTIII - SOLV	-0.13528	-0.03252	0.07024

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 59 Days (from fish that were removed)

10:24 Tuesday, June 3, 1997

General Linear Models Procedure
Class Level Information

Class	Levels	Values
REP	2	A B
TRT	6	CONT SOLV TRTI TRTII TRTIII TRTIV

Number of observations in data set = 230

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Dependent Variable: LENGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	258.92569	23.53870	2.02	0.0274
Error	218	2534.76213	11.62735		
Corrected Total	229	2793.68782			

R-Square	C.V.	Root MSE	LENGTH Mean
0.092682	7.975085	3.4099	42.757

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	38.00370	38.00370	3.27	0.0720
TRT	5	161.18532	32.23706	2.77	0.0189
REP*TRT	5	59.73668	11.94734	1.03	0.4023

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	40.28368	40.28368	3.46	0.0640
TRT	5	161.98403	32.39681	2.79	0.0184
REP*TRT	5	59.73668	11.94734	1.03	0.4023

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	5	161.98403	32.39681	2.71	0.1488

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 59 Days (from fish that were removed)
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Dependent Variable: WEIGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	0.6977144	0.0634286	1.53	0.1219
Error	218	9.0336173	0.0414386		
Corrected Total	229	9.7313317			

R-Square	C.V.	Root MSE	WEIGHT Mean
0.071698	26.24442	0.2036	0.7756

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.1643382	0.1643382	3.97	0.0477
TRT	5	0.2787708	0.0557542	1.35	0.2463
REP*TRT	5	0.2546055	0.0509211	1.23	0.2965

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.1739405	0.1739405	4.20	0.0417
TRT	5	0.2830323	0.0566065	1.37	0.2382
REP*TRT	5	0.2546055	0.0509211	1.23	0.2965

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	5	0.2830323	0.0566065	1.11	0.4552

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 59 Days (from fish that were removed)
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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	LENGTH LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4	5	6
CONT	43.8770263	1	.	0.2658	0.8220	0.1235	0.0634	0.0331
SOLV	42.9003283	2	0.2658	.	0.3570	0.5801	0.3100	0.1404
TRTI	43.6913553	3	0.8220	0.3570	.	0.1682	0.0854	0.0430
TRTII	42.4444019	4	0.1235	0.5801	0.1682	.	0.6083	0.2810
TRTIII	42.0230303	5	0.0634	0.3100	0.0854	0.6083	.	0.5195
TRTIV	41.4489375	6	0.0331	0.1404	0.0430	0.2810	0.5195	.

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

TRT	WEIGHT LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4	5	6
CONT	0.82462105	1	.	0.3265	0.9539	0.2409	0.1397	0.2054
SOLV	0.76925303	2	0.3265	.	0.3518	0.8230	0.5328	0.6801
TRTI	0.82151342	3	0.9539	0.3518	.	0.2604	0.1512	0.2210
TRTII	0.75738624	4	0.2409	0.8230	0.2604	.	0.6791	0.8349
TRTIII	0.73529697	5	0.1397	0.5328	0.1512	0.6791	.	0.8568
TRTIV	0.74557938	6	0.2054	0.6801	0.2210	0.8349	0.8568	.

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
Total Length and Wet Weight at 59 Days (from fish that were removed)
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General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 5 MSE= 11.94734
Critical Value of Dunnett's T= 2.986

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONT - SOLV	-1.3576	0.9650	3.2875
TRTI - SOLV	-1.5191	0.8034	3.1260
TRTII - SOLV	-2.7223	-0.4286	1.8650
TRTIII - SOLV	-3.1570	-0.8492	1.4585
TRTIV - SOLV	-3.9032	-1.4336	1.0360

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 59 Days (from fish that were removed)
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General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 5 MSE= 0.050921
Critical Value of Dunnett's T= 2.986

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONT - SOLV	-0.09782	0.05381	0.20543
TRTI - SOLV	-0.09961	0.05202	0.20365
TRTII - SOLV	-0.16033	-0.01059	0.13916
TRTIV - SOLV	-0.18484	-0.02361	0.13762
TRTIII - SOLV	-0.18318	-0.03252	0.11814

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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TRT=CONT

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	17	82.4023529	2.6477078	78.6500000	86.3000000
FLNGTH	23	64.0765217	4.9248928	56.0700000	74.8700000
MWGHT	17	7.1581000	0.7967924	5.3466000	8.8194000
FWGHT	23	2.9892000	0.9662034	1.6039000	5.0942000

TRT=SOLV

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	29	79.5348276	4.8357402	68.2500000	89.0600000
FLNGTH	14	63.0900000	2.8961460	58.6700000	68.3000000
MWGHT	29	6.0556621	0.9646447	4.1788000	8.3618000
FWGHT	14	2.7570643	0.5103628	1.9982000	3.8745000

TRT=TRTI

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	27	81.4500000	4.7485941	74.0400000	92.8700000
FLNGTH	18	61.2516667	3.8187005	53.6000000	69.6000000
MWGHT	27	6.7661889	1.2280138	4.3694000	9.3916000
FWGHT	18	2.3885611	0.4696578	1.2827000	3.3023000

TRT=TRTII

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	26	79.0192308	4.3975092	70.5400000	85.4100000
FLNGTH	22	63.3981818	4.5895696	54.0500000	72.4100000
MWGHT	26	6.1911077	1.4157487	3.8698000	8.7532000
FWGHT	22	2.6206636	0.7298771	1.6121000	4.6783000

TRT=TRTIII

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	25	80.7664000	5.3014525	70.1000000	92.9300000
FLNGTH	16	63.5937500	4.6457850	53.4900000	72.3600000
MWGHT	25	6.8918680	1.1760178	4.9186000	10.2126000
FWGHT	16	2.8908438	0.5351488	1.8979000	4.1734000

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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TRT=TRTIV

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	25	76.9560000	5.6190361	66.0500000	89.1500000
FLNGTH	20	60.5730000	4.2994579	52.1600000	69.7400000

MWGHT	25	6.1366880	1.5837970	4.1007000	10.1861000
FWGHT	20	2.4991800	0.7598661	1.2000000	4.5833000

TRT=TRTV

Variable	N	Mean	Std Dev	Minimum	Maximum
MLNGTH	10	65.2770000	4.0550491	58.9600000	71.5000000
FLNGTH	14	56.9050000	3.3891745	50.4700000	65.2000000
MWGHT	10	3.6412500	0.8113087	2.4530000	5.4174000
FWGHT	14	2.2006214	0.4553742	1.4288000	2.9645000

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRT	7	CONT SOLV TRTI TRTII TRTIII TRTIV TRTV
REP	2	A B

Number of observations in data set = 178

Group	Obs	Dependent Variables
1	159	MLNGTH MWGHT
2	127	FLNGTH FWGHT

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

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: MLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	2440.8392	348.6913	15.45	0.0001
Error	151	3408.8201	22.5750		
Corrected Total	158	5849.6593			

R-Square	C.V.	Root MSE	MLNGTH Mean
0.417262	6.016317	4.7513	78.974

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	2432.7149	405.4525	17.96	0.0001
REP	1	8.1243	8.1243	0.36	0.5495

Source	DF	Type III SS	Mean Square	F Value	Pr > F

TRT	6	2439.0494	406.5082	18.01	0.0001
REP	1	8.1243	8.1243	0.36	0.5495

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: MWGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	100.55834	14.36548	9.65	0.0001
Error	151	224.81745	1.48886		
Corrected Total	158	325.37579			

R-Square	C.V.	Root MSE	MWGHT Mean
0.309053	19.34133	1.2202	6.3087

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	100.52723	16.75454	11.25	0.0001
REP	1	0.03111	0.03111	0.02	0.8853

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	100.17511	16.69585	11.21	0.0001
REP	1	0.03111	0.03111	0.02	0.8853

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure
Least Squares Means

TRT	MLNGTH LSMEAN	LSMEAN Number
CONT	82.3888714	1
SOLV	79.5269246	2
TRTI	81.4754651	3
TRTII	78.9487121	4
TRTIII	80.7572326	5
TRTIV	77.0018371	6
TRTV	65.2311629	7

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

i/j	1	2	3	4	5	6	7
1	.	0.0504	0.5360	0.0219	0.2764	0.0004	0.0001
2	0.0504	.	0.1276	0.6540	0.3442	0.0539	0.0001
3	0.5360	0.1276	.	0.0566	0.5872	0.0009	0.0001
4	0.0219	0.6540	0.0566	.	0.1775	0.1498	0.0001
5	0.2764	0.3442	0.5872	0.1775	.	0.0060	0.0001
6	0.0004	0.0539	0.0009	0.1498	0.0060	.	0.0001
7	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	.

TRT	MWGHT LSMEAN	LSMEAN Number
CONT	7.15893425	1

SOLV	6.05615111	2
TRTI	6.76461309	3
TRTII	6.19547144	4
TRTIII	6.89243529	5
TRTIV	6.13385156	6
TRTV	3.64408644	7

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

i/j	1	2	3	4	5	6	7
1	.	0.0036	0.2987	0.0126	0.4883	0.0085	0.0001
2	0.0036	.	0.0316	0.6741	0.0131	0.8163	0.0001
3	0.2987	0.0316	.	0.0941	0.7067	0.0646	0.0001
4	0.0126	0.6741	0.0941	.	0.0438	0.8586	0.0001
5	0.4883	0.0131	0.7067	0.0438	.	0.0298	0.0001
6	0.0085	0.8163	0.0646	0.8586	0.0298	.	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.

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
10:24 Tuesday, June 3, 1997

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= 151 MSE= 22.57497
Critical Value of T= 3.09034

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - TRTI	-3.594	0.952	5.498	
CONT - TRTIII	-2.980	1.636	6.252	
CONT - SOLV	-1.618	2.868	7.353	
CONT - TRTII	-1.197	3.383	7.963	
CONT - TRTIV	0.831	5.446	10.062	***
CONT - TRTV	11.274	17.125	22.977	***
TRTI - CONT	-5.498	-0.952	3.594	
TRTI - TRTIII	-3.392	0.684	4.759	
TRTI - SOLV	-2.012	1.915	5.842	
TRTI - TRTII	-1.604	2.431	6.465	
TRTI - TRTIV	0.419	4.494	8.569	***
TRTI - TRTV	10.738	16.173	21.608	***
TRTIII - CONT	-6.252	-1.636	2.980	
TRTIII - TRTI	-4.759	-0.684	3.392	
TRTIII - SOLV	-2.776	1.232	5.239	
TRTIII - TRTII	-2.366	1.747	5.860	
TRTIII - TRTIV	-0.343	3.810	7.963	
TRTIII - TRTV	9.995	15.489	20.983	***
SOLV - CONT	-7.353	-2.868	1.618	
SOLV - TRTI	-5.842	-1.915	2.012	
SOLV - TRTIII	-5.239	-1.232	2.776	
SOLV - TRTII	-3.450	0.516	4.481	

SOLV - TRTIV	-1.428	2.579	6.586	
SOLV - TRTV	8.873	14.258	19.642	***
TRTII - CONT	-7.963	-3.383	1.197	
TRTII - TRTI	-6.465	-2.431	1.604	
TRTII - TRTIII	-5.860	-1.747	2.366	
TRTII - SOLV	-4.481	-0.516	3.450	
TRTII - TRTIV	-2.050	2.063	6.176	
TRTII - TRTV	8.279	13.742	19.206	***
TRTIV - CONT	-10.062	-5.446	-0.831	***
TRTIV - TRTI	-8.569	-4.494	-0.419	***
TRTIV - TRTIII	-7.963	-3.810	0.343	
TRTIV - SOLV	-6.586	-2.579	1.428	
TRTIV - TRTII	-6.176	-2.063	2.050	
TRTIV - TRTV	6.185	11.679	17.173	***
TRTV - CONT	-22.977	-17.125	-11.274	***
TRTV - TRTI	-21.608	-16.173	-10.738	***
TRTV - TRTIII	-20.983	-15.489	-9.995	***
TRTV - SOLV	-19.642	-14.258	-8.873	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTV - TRTII	-19.206	-13.742	-8.279	***
TRTV - TRTIV	-17.173	-11.679	-6.185	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: MWGHT

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= 151 MSE= 1.488857
Critical Value of T= 3.09034

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - TRTIII	-0.9192	0.2662	1.4516	
CONT - TRTI	-0.7756	0.3919	1.5594	
CONT - TRTII	-0.2091	0.9670	2.1431	
CONT - TRTIV	-0.1640	1.0214	2.2068	
CONT - SOLV	-0.0494	1.1024	2.2543	
CONT - TRTV	2.0141	3.5168	5.0196	***
TRTIII - CONT	-1.4516	-0.2662	0.9192	
TRTIII - TRTI	-0.9209	0.1257	1.1723	
TRTIII - TRTII	-0.3555	0.7008	1.7570	
TRTIII - TRTIV	-0.3114	0.7552	1.8217	

TRTIII - SOLV	-0.1929	0.8362	1.8653	
TRTIII - TRTV	1.8397	3.2506	4.6615	***
TRTI - CONT	-1.5594	-0.3919	0.7756	
TRTI - TRTIII	-1.1723	-0.1257	0.9209	
TRTI - TRTII	-0.4610	0.5751	1.6112	
TRTI - TRTIV	-0.4171	0.6295	1.6761	
TRTI - SOLV	-0.2979	0.7105	1.7190	
TRTI - TRTV	1.7290	3.1249	4.5208	***
TRTII - CONT	-2.1431	-0.9670	0.2091	
TRTII - TRTIII	-1.7570	-0.7008	0.3555	
TRTII - TRTI	-1.6112	-0.5751	0.4610	
TRTII - TRTIV	-1.0018	0.0544	1.1107	
TRTII - SOLV	-0.8830	0.1354	1.1539	
TRTII - TRTV	1.1467	2.5499	3.9530	***
TRTIV - CONT	-2.2068	-1.0214	0.1640	
TRTIV - TRTIII	-1.8217	-0.7552	0.3114	
TRTIV - TRTI	-1.6761	-0.6295	0.4171	
TRTIV - TRTII	-1.1107	-0.0544	1.0018	
TRTIV - SOLV	-0.9481	0.0810	1.1101	
TRTIV - TRTV	1.0845	2.4954	3.9063	***
SOLV - CONT	-2.2543	-1.1024	0.0494	
SOLV - TRTIII	-1.8653	-0.8362	0.1929	
SOLV - TRTI	-1.7190	-0.7105	0.2979	
SOLV - TRTII	-1.1539	-0.1354	0.8830	
SOLV - TRTIV	-1.1101	-0.0810	0.9481	
SOLV - TRTV	1.0316	2.4144	3.7972	***
TRTV - CONT	-5.0196	-3.5168	-2.0141	***
TRTV - TRTIII	-4.6615	-3.2506	-1.8397	***
TRTV - TRTI	-4.5208	-3.1249	-1.7290	***
TRTV - TRTII	-3.9530	-2.5499	-1.1467	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTV - TRTIV	-3.9063	-2.4954	-1.0845	***
TRTV - SOLV	-3.7972	-2.4144	-1.0316	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
10:24 Tuesday, June 3, 1997

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= 151 MSE= 22.57497
Critical Value of Dunnett's T= 2.341

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

TRT	Simultaneous Lower Confidence	Difference Between	Simultaneous Upper Confidence

Comparison	Limit	Means	Limit	
CONT - SOLV	-0.530	2.868	6.266	
TRTI - SOLV	-1.060	1.915	4.890	
TRTIII - SOLV	-1.804	1.232	4.268	
TRTII - SOLV	-3.520	-0.516	2.489	
TRTIV - SOLV	-5.615	-2.579	0.457	
TRTV - SOLV	-18.337	-14.258	-10.178	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 151 MSE= 1.488857
Critical Value of Dunnett's T= 2.341

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - SOLV	0.2298	1.1024	1.9751	
TRTIII - SOLV	0.0565	0.8362	1.6159	
TRTI - SOLV	-0.0535	0.7105	1.4745	
TRTII - SOLV	-0.6361	0.1354	0.9070	
TRTIV - SOLV	-0.6986	0.0810	0.8607	
TRTV - SOLV	-3.4621	-2.4144	-1.3668	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: FLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	638.80543	91.25792	5.09	0.0001
Error	119	2131.79154	17.91421		
Corrected Total	126	2770.59698			

R-Square	C.V.	Root MSE	FLNGTH Mean
0.230566	6.821497	4.2325	62.047

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	613.41193	102.23532	5.71	0.0001
REP	1	25.39350	25.39350	1.42	0.2362

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	590.13200	98.35533	5.49	0.0001
REP	1	25.39350	25.39350	1.42	0.2362

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: FWGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	8.7705460	1.2529351	2.65	0.0140
Error	119	56.3010489	0.4731181		
Corrected Total	126	65.0715948			

R-Square	C.V.	Root MSE	FWGHT Mean
0.134783	26.07266	0.6878	2.6381

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	8.2483857	1.3747310	2.91	0.0111
REP	1	0.5221602	0.5221602	1.10	0.2956

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	8.2716636	1.3786106	2.91	0.0109
REP	1	0.5221602	0.5221602	1.10	0.2956

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure
Least Squares Means

TRT	FLNGTH LSMEAN	LSMEAN Number
CONT	64.1771382	1
SOLV	63.2222388	2
TRTI	61.2516667	3
TRTII	63.2719538	4
TRTIII	63.6516045	5
TRTIV	60.7581344	6
TRTV	57.0372388	7

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

i/j	1	2	3	4	5	6	7
1	.	0.5071	0.0303	0.4796	0.7037	0.0095	0.0001
2	0.5071	.	0.1951	0.9730	0.7823	0.0976	0.0002
3	0.0303	0.1951	.	0.1370	0.1017	0.7220	0.0062
4	0.4796	0.9730	0.1370	.	0.7866	0.0619	0.0001
5	0.7037	0.7823	0.1017	0.7866	.	0.0443	0.0001
6	0.0095	0.0976	0.7220	0.0619	0.0443	.	0.0130
7	0.0001	0.0002	0.0062	0.0001	0.0001	0.0130	.

TRT	FWGHT LSMEAN	LSMEAN Number
CONT	3.00362812	1
SOLV	2.77602696	2
TRTI	2.38856111	3

TRTII	2.60256290	4
TRTIII	2.89913992	5
TRTIV	2.52572775	6
TRTV	2.21958410	7

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

i/j	1	2	3	4	5	6	7
1	.	0.3311	0.0054	0.0556	0.6417	0.0251	0.0010
2	0.3311	.	0.1176	0.4671	0.6260	0.2987	0.0344
3	0.0054	0.1176	.	0.3311	0.0328	0.5431	0.4931
4	0.0556	0.4671	0.3311	.	0.1947	0.7236	0.1099
5	0.6417	0.6260	0.0328	0.1947	.	0.1092	0.0080
6	0.0251	0.2987	0.5431	0.7236	0.1092	.	0.2042
7	0.0010	0.0344	0.4931	0.1099	0.0080	0.2042	.

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

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
10:24 Tuesday, June 3, 1997

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= 119 MSE= 17.91421
Critical Value of T= 3.10467

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - TRTIII	-3.795	0.483	4.761	
CONT - TRTII	-3.240	0.678	4.597	
CONT - SOLV	-3.468	0.987	5.441	
CONT - TRTI	-1.310	2.825	6.960	
CONT - TRTIV	-0.514	3.504	7.521	
CONT - TRTV	2.717	7.172	11.626	***
TRTIII - CONT	-4.761	-0.483	3.795	
TRTIII - TRTII	-4.122	0.196	4.513	
TRTIII - SOLV	-4.305	0.504	5.313	
TRTIII - TRTI	-2.173	2.342	6.857	
TRTIII - TRTIV	-1.387	3.021	7.428	
TRTIII - TRTV	1.880	6.689	11.498	***
TRTII - CONT	-4.597	-0.678	3.240	
TRTII - TRTIII	-4.513	-0.196	4.122	
TRTII - SOLV	-4.184	0.308	4.801	
TRTII - TRTI	-2.030	2.147	6.323	
TRTII - TRTIV	-1.235	2.825	6.885	
TRTII - TRTV	2.001	6.493	10.986	***
SOLV - CONT	-5.441	-0.987	3.468	
SOLV - TRTIII	-5.313	-0.504	4.305	
SOLV - TRTII	-4.801	-0.308	4.184	
SOLV - TRTI	-2.844	1.838	6.521	
SOLV - TRTIV	-2.062	2.517	7.096	
SOLV - TRTV	1.218	6.185	11.152	***

TRTI - CONT	-6.960	-2.825	1.310	
TRTI - TRTIII	-6.857	-2.342	2.173	
TRTI - TRTII	-6.323	-2.147	2.030	
TRTI - SOLV	-6.521	-1.838	2.844	
TRTI - TRTIV	-3.591	0.679	4.948	
TRTI - TRTV	-0.336	4.347	9.029	
TRTIV - CONT	-7.521	-3.504	0.514	
TRTIV - TRTIII	-7.428	-3.021	1.387	
TRTIV - TRTII	-6.885	-2.825	1.235	
TRTIV - SOLV	-7.096	-2.517	2.062	
TRTIV - TRTI	-4.948	-0.679	3.591	
TRTIV - TRTV	-0.911	3.668	8.247	
TRTV - CONT	-11.626	-7.172	-2.717	***
TRTV - TRTIII	-11.498	-6.689	-1.880	***
TRTV - TRTII	-10.986	-6.493	-2.001	***
TRTV - SOLV	-11.152	-6.185	-1.218	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRTV - TRTI	-9.029	-4.347	0.336
TRTV - TRTIV	-8.247	-3.668	0.911

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: FWGHT

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= 119 MSE= 0.473118
Critical Value of T= 3.10467

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - TRTIII	-0.5968	0.0984	0.7936	
CONT - SOLV	-0.4918	0.2321	0.9560	
CONT - TRTII	-0.2683	0.3685	1.0054	
CONT - TRTIV	-0.1629	0.4900	1.1429	
CONT - TRTI	-0.0714	0.6006	1.2727	
CONT - TRTV	0.0647	0.7886	1.5125	***
TRTIII - CONT	-0.7936	-0.0984	0.5968	
TRTIII - SOLV	-0.6477	0.1338	0.9153	
TRTIII - TRTII	-0.4315	0.2702	0.9718	
TRTIII - TRTIV	-0.3246	0.3917	1.1079	
TRTIII - TRTI	-0.2315	0.5023	1.2360	
TRTIII - TRTV	-0.0913	0.6902	1.4717	

SOLV	- CONT	-0.9560	-0.2321	0.4918	
SOLV	- TRTIII	-0.9153	-0.1338	0.6477	
SOLV	- TRTII	-0.5937	0.1364	0.8665	
SOLV	- TRTIV	-0.4863	0.2579	1.0020	
SOLV	- TRTI	-0.3925	0.3685	1.1295	
SOLV	- TRTV	-0.2507	0.5564	1.3636	
TRTII	- CONT	-1.0054	-0.3685	0.2683	
TRTII	- TRTIII	-0.9718	-0.2702	0.4315	
TRTII	- SOLV	-0.8665	-0.1364	0.5937	
TRTII	- TRTIV	-0.5383	0.1215	0.7813	
TRTII	- TRTI	-0.4466	0.2321	0.9108	
TRTII	- TRTV	-0.3100	0.4200	1.1501	
TRTIV	- CONT	-1.1429	-0.4900	0.1629	
TRTIV	- TRTIII	-1.1079	-0.3917	0.3246	
TRTIV	- SOLV	-1.0020	-0.2579	0.4863	
TRTIV	- TRTII	-0.7813	-0.1215	0.5383	
TRTIV	- TRTI	-0.5832	0.1106	0.8044	
TRTIV	- TRTV	-0.4456	0.2986	1.0427	
TRTI	- CONT	-1.2727	-0.6006	0.0714	
TRTI	- TRTIII	-1.2360	-0.5023	0.2315	
TRTI	- SOLV	-1.1295	-0.3685	0.3925	
TRTI	- TRTII	-0.9108	-0.2321	0.4466	
TRTI	- TRTIV	-0.8044	-0.1106	0.5832	
TRTI	- TRTV	-0.5730	0.1879	0.9489	
TRTV	- CONT	-1.5125	-0.7886	-0.0647	***
TRTV	- TRTIII	-1.4717	-0.6902	0.0913	
TRTV	- SOLV	-1.3636	-0.5564	0.2507	
TRTV	- TRTII	-1.1501	-0.4200	0.3100	

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRTV - TRTIV	-1.0427	-0.2986	0.4456
TRTV - TRTI	-0.9489	-0.1879	0.5730

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
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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= 119 MSE= 17.91421
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	
CONT - SOLV	-2.298	0.987	4.271	
TRTIII - SOLV	-3.042	0.504	4.049	
TRTII - SOLV	-3.004	0.308	3.620	
TRTI - SOLV	-5.291	-1.838	1.614	
TRTIV - SOLV	-5.893	-2.517	0.859	
TRTV - SOLV	-9.847	-6.185	-2.523	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
Total Length and Wet Weight at 260 Days
10:24 Tuesday, June 3, 1997

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 119 MSE= 0.473118
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
CONT - SOLV	-0.3016	0.2321	0.7658
TRTIII - SOLV	-0.4424	0.1338	0.7100
TRTII - SOLV	-0.6747	-0.1364	0.4019
TRTIV - SOLV	-0.8065	-0.2579	0.2908
TRTI - SOLV	-0.9295	-0.3685	0.1925
TRTV - SOLV	-1.1515	-0.5564	0.0386

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure
Class Level Information

Class	Levels	Values
REP	2	A B
TRT	7	CONT SOLV TRTI TRTII TRTIII TRTIV TRTV

Number of observations in data set = 178

Group	Obs	Dependent Variables
1	159	MLNGTH MWGHT
2	127	FLNGTH FWGHT

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
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: MLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	2673.2742	205.6365	9.39	0.0001
Error	145	3176.3851	21.9061		
Corrected Total	158	5849.6593			

R-Square	C.V.	Root MSE	MLNGTH Mean
0.456997	5.926519	4.6804	78.974

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	1.7898	1.7898	0.08	0.7754
TRT	6	2439.0494	406.5082	18.56	0.0001
REP*TRT	6	232.4350	38.7392	1.77	0.1095

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	1.5013	1.5013	0.07	0.7939
TRT	6	2343.4889	390.5815	17.83	0.0001
REP*TRT	6	232.4350	38.7392	1.77	0.1095

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	2343.4889	390.5815	10.08	0.0064

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: MWGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	123.61523	9.50886	6.83	0.0001
Error	145	201.76056	1.39145		
Corrected Total	158	325.37579			

R-Square	C.V.	Root MSE	MWGHT Mean
0.379915	18.69794	1.1796	6.3087

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.38323	0.38323	0.28	0.6005
TRT	6	100.17511	16.69585	12.00	0.0001
REP*TRT	6	23.05690	3.84282	2.76	0.0143

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.242476	0.242476	0.17	0.6770
TRT	6	94.998125	15.833021	11.38	0.0001
REP*TRT	6	23.056897	3.842816	2.76	0.0143

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	94.998125	15.833021	4.12	0.0544

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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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
CONT	82.4595139	1
SOLV	79.5273571	2
TRTI	81.6056667	3
TRTII	79.6486928	4
TRTIII	80.7148397	5
TRTIV	77.1801667	6
TRTV	65.3320833	7

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

i/j	1	2	3	4	5	6	7
1	.	0.1744	0.6743	0.2061	0.4075	0.0369	0.0005
2	0.1744	.	0.2598	0.9463	0.5110	0.2209	0.0009
3	0.6743	0.2598	.	0.3088	0.6257	0.0449	0.0004
4	0.2061	0.9463	0.3088	.	0.5728	0.2206	0.0010
5	0.4075	0.5110	0.6257	0.5728	.	0.0942	0.0006
6	0.0369	0.2209	0.0449	0.2206	0.0942	.	0.0025
7	0.0005	0.0009	0.0004	0.0010	0.0006	0.0025	.

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

TRT	MWGHT LSMEAN	LSMEAN Number
CONT	7.17152708	1
SOLV	6.05848738	2
TRTI	6.78902500	3
TRTII	6.41753987	4
TRTIII	6.88425801	5
TRTIV	6.24405500	6
TRTV	3.67759583	7

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

i/j	1	2	3	4	5	6	7
1	.	0.1128	0.5531	0.2728	0.6580	0.1866	0.0045
2	0.1128	.	0.2143	0.5337	0.1739	0.7433	0.0172
3	0.5531	0.2143	.	0.5277	0.8673	0.3613	0.0056
4	0.2728	0.5337	0.5277	.	0.4390	0.7706	0.0107
5	0.6580	0.1739	0.8673	0.4390	.	0.2968	0.0051
6	0.1866	0.7433	0.3613	0.7706	0.2968	.	0.0140
7	0.0045	0.0172	0.0056	0.0107	0.0051	0.0140	.

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
Total Length and Wet Weight at 260 Days
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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= 38.73917
Critical Value of Dunnett's T= 2.979

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - SOLV	-2.796	2.868	8.531	
TRTI - SOLV	-3.043	1.915	6.873	
TRTIII - SOLV	-3.828	1.232	6.292	
TRTII - SOLV	-5.523	-0.516	4.492	
TRTIV - SOLV	-7.639	-2.579	2.481	
TRTV - SOLV	-21.057	-14.258	-7.459	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

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

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= 3.842816
Critical Value of Dunnett's T= 2.979

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - SOLV	-0.6813	1.1024	2.8861	
TRTIII - SOLV	-0.7575	0.8362	2.4299	
TRTI - SOLV	-0.8511	0.7105	2.2722	
TRTII - SOLV	-1.4417	0.1354	1.7126	
TRTIV - SOLV	-1.5126	0.0810	1.6747	
TRTV - SOLV	-4.5558	-2.4144	-0.2730	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: FLNGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	681.05381	52.38875	2.83	0.0015
Error	113	2089.54317	18.49153		
Corrected Total	126	2770.59698			

R-Square	C.V.	Root MSE	FLNGTH Mean
0.245815	6.930543	4.3002	62.047

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	48.67344	48.67344	2.63	0.1075
TRT	6	590.13200	98.35533	5.32	0.0001
REP*TRT	6	42.24838	7.04140	0.38	0.8900

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	25.93903	25.93903	1.40	0.2387
TRT	6	564.71809	94.11968	5.09	0.0001
REP*TRT	6	42.24838	7.04140	0.38	0.8900

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	564.71809	94.11968	13.37	0.0030

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

Dependent Variable: FWGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	9.6416579	0.7416660	1.51	0.1236
Error	113	55.4299369	0.4905304		
Corrected Total	126	65.0715948			

R-Square	C.V.	Root MSE	FWGHT Mean
0.148170	26.54811	0.7004	2.6381

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.4988823	0.4988823	1.02	0.3154
TRT	6	8.2716636	1.3786106	2.81	0.0138
REP*TRT	6	0.8711119	0.1451853	0.30	0.9377

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.5961409	0.5961409	1.22	0.2726
TRT	6	7.9451920	1.3241987	2.70	0.0174
REP*TRT	6	0.8711119	0.1451853	0.30	0.9377

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	7.9451920	1.3241987	9.12	0.0083

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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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
CONT	64.3690079	1
SOLV	63.3677778	2
TRTI	61.2516667	3
TRTII	63.4532143	4
TRTIII	63.5784127	5
TRTIV	60.5859524	6
TRTV	57.1936667	7

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

i/j	1	2	3	4	5	6	7
1	.	0.3241	0.0102	0.3050	0.4019	0.0046	0.0003
2	0.3241	.	0.0717	0.9309	0.8397	0.0300	0.0011
3	0.0102	0.0717	.	0.0426	0.0440	0.4875	0.0058
4	0.3050	0.9309	0.0426	.	0.8928	0.0169	0.0006
5	0.4019	0.8397	0.0440	0.8928	.	0.0182	0.0007
6	0.0046	0.0300	0.4875	0.0169	0.0182	.	0.0136
7	0.0003	0.0011	0.0058	0.0006	0.0007	0.0136	.

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

TRT	FWGHT LSMEAN	LSMEAN Number
CONT	3.01770595	1
SOLV	2.82323222	2
TRTI	2.38856111	3
TRTII	2.62600179	4
TRTIII	2.88348810	5
TRTIV	2.52464762	6
TRTV	2.23205222	7

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

i/j	1	2	3	4	5	6	7
1	.	0.1965	0.0020	0.0156	0.3273	0.0072	0.0011
2	0.1965	.	0.0205	0.1964	0.6886	0.0788	0.0077
3	0.0020	0.0205	.	0.1024	0.0093	0.3330	0.3036
4	0.0156	0.1964	0.1024	.	0.0907	0.4504	0.0272
5	0.3273	0.6886	0.0093	0.0907	.	0.0363	0.0039
6	0.0072	0.0788	0.3330	0.4504	0.0363	.	0.0836
7	0.0011	0.0077	0.3036	0.0272	0.0039	0.0836	.

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
Total Length and Wet Weight at 260 Days
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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= 7.041396

Critical Value of Dunnett's T= 2.866

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - SOLV	-1.5911	0.9865	3.5641	
TRTIII - SOLV	-2.2790	0.5038	3.2865	
TRTII - SOLV	-2.2915	0.3082	2.9078	
TRTI - SOLV	-4.5480	-1.8383	0.8713	
TRTIV - SOLV	-5.1667	-2.5170	0.1327	
TRTV - SOLV	-9.0590	-6.1850	-3.3110	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
Total Length and Wet Weight at 260 Days
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General Linear Models Procedure

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

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= 0.145185
Critical Value of Dunnett's T= 2.866

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
CONT - SOLV	-0.1380	0.2321	0.6023	
TRTIII - SOLV	-0.2658	0.1338	0.5334	
TRTII - SOLV	-0.5097	-0.1364	0.2369	
TRTIV - SOLV	-0.6384	-0.2579	0.1226	
TRTI - SOLV	-0.7576	-0.3685	0.0206	
TRTV - SOLV	-0.9691	-0.5564	-0.1438	***

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TRT=CONT

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	170	28.5541765	2.3873869	12.1700000	34.6200000
WEIGHT	169	0.2086355	0.0601496	0.0081000	0.4162000

TRT=SOLV

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	188	28.3503723	2.6531723	10.7000000	32.3700000
WEIGHT	188	0.1971894	0.0438347	0.0047000	0.2938000

TRT=TRTI

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	198	29.3485354	1.9917012	23.4900000	33.7000000
WEIGHT	198	0.2265919	0.0504981	0.1031000	0.3674000

TRT=TRTII

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	166	28.7269277	1.7201405	23.9500000	32.7400000
WEIGHT	166	0.2115404	0.0419421	0.1107000	0.3503000

TRT=TRTIII

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	176	27.1790909	2.9523250	11.6000000	31.7900000
WEIGHT	176	0.1779199	0.0514276	0.0066000	0.2887000

TRT=TRTIV

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	180	25.0847222	2.8604017	10.0200000	30.7700000
WEIGHT	180	0.1433850	0.0457239	0.0033000	0.2436000

TRT=TRTV

Variable	N	Mean	Std Dev	Minimum	Maximum
LENGTH	172	20.9858721	2.5490030	11.7000000	25.2600000
WEIGHT	172	0.0791453	0.0259266	0.0108000	0.1315000

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
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General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRT	7	CONT SOLV TRTI TRTII TRTIII TRTIV TRTV
REP	2	A B

Number of observations in data set = 1250

Group	Obs	Dependent Variables
1	1250	LENGTH
2	1249	WEIGHT

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

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
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General Linear Models Procedure

Dependent Variable: LENGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	9222.9095	1317.5585	213.90	0.0001
Error	1242	7650.2012	6.1596		
Corrected Total	1249	16873.1107			

R-Square	C.V.	Root MSE	LENGTH Mean
0.546604	9.213305	2.4819	26.938

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	9222.8753	1537.1459	249.55	0.0001
REP	1	0.0341	0.0341	0.01	0.9407

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	9212.3662	1535.3944	249.27	0.0001
REP	1	0.0341	0.0341	0.01	0.9407

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
30-Day Post-Hatch F1 Length and Wet Weight
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General Linear Models Procedure
Least Squares Means

TRT	LENGTH LSMEAN	LSMEAN Number
CONT	28.5549160	1
SOLV	28.3504281	2

TRTI	29.3485354	3
TRTII	28.7272433	4
TRTIII	27.1785552	5
TRTIV	25.0844312	6
TRTV	20.9856284	7

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

i/j	1	2	3	4	5	6	7
1	.	0.4367	0.0023	0.5248	0.0001	0.0001	0.0001
2	0.4367	.	0.0001	0.1543	0.0001	0.0001	0.0001
3	0.0023	0.0001	.	0.0175	0.0001	0.0001	0.0001
4	0.5248	0.1543	0.0175	.	0.0001	0.0001	0.0001
5	0.0001	0.0001	0.0001	0.0001	.	0.0001	0.0001
6	0.0001	0.0001	0.0001	0.0001	0.0001	.	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.

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
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General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: LENGTH

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= 1242 MSE= 6.159582
Critical Value of T= 3.04434

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - TRTII	-0.1735	0.6216	1.4167	
TRTI - CONT	0.0043	0.7944	1.5844	***
TRTI - SOLV	0.2288	0.9982	1.7676	***
TRTI - TRTIII	1.3867	2.1694	2.9522	***
TRTI - TRTIV	3.4857	4.2638	5.0419	***
TRTI - TRTV	7.5751	8.3627	9.1502	***
TRTII - TRTI	-1.4167	-0.6216	0.1735	
TRTII - CONT	-0.6517	0.1728	0.9972	
TRTII - SOLV	-0.4282	0.3766	1.1813	
TRTII - TRTIII	0.7304	1.5478	2.3653	***
TRTII - TRTIV	2.8292	3.6422	4.4553	***
TRTII - TRTV	6.9190	7.7411	8.5631	***
CONT - TRTI	-1.5844	-0.7944	-0.0043	***
CONT - TRTII	-0.9972	-0.1728	0.6517	
CONT - SOLV	-0.5959	0.2038	1.0035	
CONT - TRTIII	0.5626	1.3751	2.1876	***
CONT - TRTIV	2.6614	3.4695	4.2775	***
CONT - TRTV	6.7512	7.5683	8.3854	***
SOLV - TRTI	-1.7676	-0.9982	-0.2288	***
SOLV - TRTII	-1.1813	-0.3766	0.4282	
SOLV - CONT	-1.0035	-0.2038	0.5959	
SOLV - TRTIII	0.3788	1.1713	1.9638	***
SOLV - TRTIV	2.4777	3.2657	4.0536	***

SOLV - TRTV	6.5673	7.3645	8.1617	***
TRTIII - TRTI	-2.9522	-2.1694	-1.3867	***
TRTIII - TRTII	-2.3653	-1.5478	-0.7304	***
TRTIII - CONT	-2.1876	-1.3751	-0.5626	***
TRTIII - SOLV	-1.9638	-1.1713	-0.3788	***
TRTIII - TRTIV	1.2934	2.0944	2.8953	***
TRTIII - TRTV	5.3831	6.1932	7.0033	***
TRTIV - TRTI	-5.0419	-4.2638	-3.4857	***
TRTIV - TRTII	-4.4553	-3.6422	-2.8292	***
TRTIV - CONT	-4.2775	-3.4695	-2.6614	***
TRTIV - SOLV	-4.0536	-3.2657	-2.4777	***
TRTIV - TRTIII	-2.8953	-2.0944	-1.2934	***
TRTIV - TRTV	3.2932	4.0989	4.9045	***
TRTV - TRTI	-9.1502	-8.3627	-7.5751	***
TRTV - TRTII	-8.5631	-7.7411	-6.9190	***
TRTV - CONT	-8.3854	-7.5683	-6.7512	***
TRTV - SOLV	-8.1617	-7.3645	-6.5673	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTV - TRTIII	-7.0033	-6.1932	-5.3831	***
TRTV - TRTIV	-4.9045	-4.0989	-3.2932	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 1242 MSE= 6.159582
Critical Value of Dunnett's T= 2.300

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - SOLV	0.4168	0.9982	1.5795	
TRTII - SOLV	-0.2315	0.3766	0.9846	
CONT - SOLV	-0.4004	0.2038	0.8080	
TRTIII - SOLV	-1.7701	-1.1713	-0.5725	***
TRTIV - SOLV	-3.8610	-3.2657	-2.6703	***
TRTV - SOLV	-7.9669	-7.3645	-6.7621	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

Dependent Variable: WEIGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	2.7781772	0.3968825	181.63	0.0001
Error	1241	2.7117689	0.0021851		
Corrected Total	1248	5.4899461			

R-Square	C.V.	Root MSE	WEIGHT Mean
0.506048	26.17606	0.0467	0.1786

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	2.7781754	0.4630292	211.90	0.0001
REP	1	0.0000018	0.0000018	0.00	0.9770

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	2.7740701	0.4623450	211.59	0.0001
REP	1	0.0000018	0.0000018	0.00	0.9770

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure
Least Squares Means

TRT	WEIGHT LSMEAN	LSMEAN Number
CONT	0.20863030	1
SOLV	0.19718896	2
TRTI	0.22659192	3
TRTII	0.21153806	4
TRTIII	0.17792379	5
TRTIV	0.14338712	6
TRTV	0.07914713	7

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

i/j	1	2	3	4	5	6	7
1	.	0.0212	0.0003	0.5694	0.0001	0.0001	0.0001
2	0.0212	.	0.0001	0.0040	0.0001	0.0001	0.0001
3	0.0003	0.0001	.	0.0023	0.0001	0.0001	0.0001
4	0.5694	0.0040	0.0023	.	0.0001	0.0001	0.0001
5	0.0001	0.0001	0.0001	0.0001	.	0.0001	0.0001
6	0.0001	0.0001	0.0001	0.0001	0.0001	.	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.

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: WEIGHT

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= 1241 MSE= 0.002185
Critical Value of T= 3.04435

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - TRTII	0.000075	0.015052	0.030028	***
TRTI - CONT	0.003053	0.017956	0.032860	***
TRTI - SOLV	0.014911	0.029403	0.043894	***
TRTI - TRTIII	0.033929	0.048672	0.063415	***
TRTI - TRTIV	0.068551	0.083207	0.097863	***
TRTI - TRTV	0.132613	0.147447	0.162280	***
TRTII - TRTI	-0.030028	-0.015052	-0.000075	***
TRTII - CONT	-0.012646	0.002905	0.018456	
TRTII - SOLV	-0.000806	0.014351	0.029508	
TRTII - TRTIII	0.018223	0.033620	0.049018	***
TRTII - TRTIV	0.052842	0.068155	0.083469	***
TRTII - TRTV	0.116911	0.132395	0.147879	***
CONT - TRTI	-0.032860	-0.017956	-0.003053	***
CONT - TRTII	-0.018456	-0.002905	0.012646	
CONT - SOLV	-0.003639	0.011446	0.026531	
CONT - TRTIII	0.015389	0.030716	0.046042	***
CONT - TRTIV	0.050008	0.065251	0.080493	***
CONT - TRTV	0.114077	0.129490	0.144904	***
SOLV - TRTI	-0.043894	-0.029403	-0.014911	***
SOLV - TRTII	-0.029508	-0.014351	0.000806	
SOLV - CONT	-0.026531	-0.011446	0.003639	
SOLV - TRTIII	0.004343	0.019269	0.034196	***
SOLV - TRTIV	0.038964	0.053804	0.068645	***
SOLV - TRTV	0.103028	0.118044	0.133060	***
TRTIII - TRTI	-0.063415	-0.048672	-0.033929	***
TRTIII - TRTII	-0.049018	-0.033620	-0.018223	***
TRTIII - CONT	-0.046042	-0.030716	-0.015389	***
TRTIII - SOLV	-0.034196	-0.019269	-0.004343	***
TRTIII - TRTIV	0.019449	0.034535	0.049621	***
TRTIII - TRTV	0.083516	0.098775	0.114033	***
TRTIV - TRTI	-0.097863	-0.083207	-0.068551	***
TRTIV - TRTII	-0.083469	-0.068155	-0.052842	***
TRTIV - CONT	-0.080493	-0.065251	-0.050008	***
TRTIV - SOLV	-0.068645	-0.053804	-0.038964	***
TRTIV - TRTIII	-0.049621	-0.034535	-0.019449	***
TRTIV - TRTV	0.049065	0.064240	0.079414	***
TRTV - TRTI	-0.162280	-0.147447	-0.132613	***
TRTV - TRTII	-0.147879	-0.132395	-0.116911	***
TRTV - CONT	-0.144904	-0.129490	-0.114077	***
TRTV - SOLV	-0.133060	-0.118044	-0.103028	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
30-Day Post-Hatch F1 Length and Wet Weight
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General Linear Models Procedure

TRT	Simultaneous Lower Confidence	Difference Between	Simultaneous Upper Confidence

Comparison	Limit	Means	Limit	
TRTV - TRTIII	-0.114033	-0.098775	-0.083516	***
TRTV - TRTIV	-0.079414	-0.064240	-0.049065	***

DITHIOPYR TECHNICAL - FATHEAD MINNOW FULL LIFE-CYCLE
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 1241 MSE= 0.002185
Critical Value of Dunnett's T= 2.300

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - SOLV	0.018452	0.029403	0.040353	
TRTII - SOLV	0.002898	0.014351	0.025804	
CONT - SOLV	0.000047	0.011446	0.022845	
TRTIII - SOLV	-0.030548	-0.019269	-0.007991	***
TRTIV - SOLV	-0.065018	-0.053804	-0.042590	***
TRTV - SOLV	-0.129390	-0.118044	-0.106698	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure
Class Level Information

Class	Levels	Values
REP	2	A B
TRT	7	CONT SOLV TRTI TRTII TRTIII TRTIV TRTV

Number of observations in data set = 1250

Group	Obs	Dependent Variables
1	1250	LENGTH
2	1249	WEIGHT

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
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

Dependent Variable: LENGTH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	9564.6204	735.7400	124.43	0.0001
Error	1236	7308.4902	5.9130		
Corrected Total	1249	16873.1107			

R-Square	C.V.	Root MSE	LENGTH Mean
0.566856	9.027020	2.4317	26.938

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	10.5432	10.5432	1.78	0.1820
TRT	6	9212.3662	1535.3944	259.66	0.0001
REP*TRT	6	341.7110	56.9518	9.63	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.6465	0.6465	0.11	0.7410
TRT	6	9286.5854	1547.7642	261.76	0.0001
REP*TRT	6	341.7110	56.9518	9.63	0.0001

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	9286.5854	1547.7642	27.18	0.0004

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

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	LENGTH LSMEAN	LSMEAN Number
CONT	28.6089062	1
SOLV	28.3506367	2
TRTI	29.3485354	3
TRTII	28.7392235	4
TRTIII	27.1826869	5
TRTIV	25.1338111	6
TRTV	20.9447547	7

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

i/j	1	2	3	4	5	6	7
1	.	0.7586	0.3872	0.8802	0.1318	0.0052	0.0001
2	0.7586	.	0.2418	0.6462	0.1916	0.0065	0.0001
3	0.3872	0.2418	.	0.4725	0.0327	0.0016	0.0001
4	0.8802	0.6462	0.4725	.	0.1062	0.0044	0.0001
5	0.1318	0.1916	0.0327	0.1062	.	0.0434	0.0003
6	0.0052	0.0065	0.0016	0.0044	0.0434	.	0.0020
7	0.0001	0.0001	0.0001	0.0001	0.0003	0.0020	.

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
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

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

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= 56.95183
Critical Value of Dunnett's T= 2.932

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - SOLV	-1.2547	0.9982	3.2510	
TRTII - SOLV	-1.9797	0.3766	2.7328	
CONT - SOLV	-2.1377	0.2038	2.5453	
TRTIII - SOLV	-3.4917	-1.1713	1.1492	
TRTIV - SOLV	-5.5727	-3.2657	-0.9586	***
TRTV - SOLV	-9.6988	-7.3645	-5.0302	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

Dependent Variable: WEIGHT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	2.9835798	0.2295061	113.09	0.0001
Error	1235	2.5063663	0.0020294		
Corrected Total	1248	5.4899461			

R-Square	C.V.	Root MSE	WEIGHT Mean
0.543462	25.22625	0.0450	0.1786

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.0041070	0.0041070	2.02	0.1551
TRT	6	2.7740701	0.4623450	227.82	0.0001
REP*TRT	6	0.2054026	0.0342338	16.87	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.0001871	0.0001871	0.09	0.7615
TRT	6	2.7989842	0.4664974	229.86	0.0001
REP*TRT	6	0.2054026	0.0342338	16.87	0.0001

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	2.7989842	0.4664974	13.63	0.0029

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

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	WEIGHT LSMEAN	LSMEAN Number
CONT	0.21151183	1
SOLV	0.19725589	2
TRTI	0.22659192	3
TRTII	0.21140498	4
TRTIII	0.17764087	5
TRTIV	0.14450226	6
TRTV	0.07874680	7

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

i/j	1	2	3	4	5	6	7
1	.	0.4967	0.4681	0.9960	0.1425	0.0152	0.0006
2	0.4967	.	0.1705	0.5001	0.3524	0.0341	0.0009
3	0.4681	0.1705	.	0.4655	0.0437	0.0051	0.0003
4	0.9960	0.5001	0.4655	.	0.1438	0.0153	0.0006
5	0.1425	0.3524	0.0437	0.1438	.	0.1432	0.0025
6	0.0152	0.0341	0.0051	0.0153	0.1432	.	0.0158
7	0.0006	0.0009	0.0003	0.0006	0.0025	0.0158	.

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
30-Day Post-Hatch F1 Length and Wet Weight
10:45 Wednesday, June 4, 1997

General Linear Models Procedure

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

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= 0.034234
Critical Value of Dunnett's T= 2.932

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRTI - SOLV	-0.02584	0.02940	0.08464	
TRTII - SOLV	-0.04342	0.01435	0.07212	
CONT - SOLV	-0.04605	0.01145	0.06895	
TRTIII - SOLV	-0.07616	-0.01927	0.03762	
TRTIV - SOLV	-0.11037	-0.05380	0.00276	
TRTV - SOLV	-0.17528	-0.11804	-0.06081	***