

US EPA ARCHIVE DOCUMENT

S406678
SUBMISSION #

129011
SHAUGHNESSY NO.

REVIEW NO.

EEB REVIEW

DATE: IN 11-26-91

DATE: OUT 3-29-93

FILE OR ID NO. MRID 418750-08

PETITION OR EXP. NO. _____

DATE OF SUBMISSION 10-28-91

DATE RECEIVED BY EFED 11-26-91

RD REQUESTED COMPLETION DATE 5-5-92

EEB ESTIMATED COMPLETION DATE 03-15-93

RD ACTION CODE/TYPE OF REVIEW Data Evaluation Record

Fish Early Life-Stage --

Fathead Minnow

TYPE OF PRODUCT(S) : I,D,H,F,N,R,S Fungicide

DATA ACCESSION NO(S). _____

PRODUCT MANAGER (NO.) Cynthia Giles-Parker

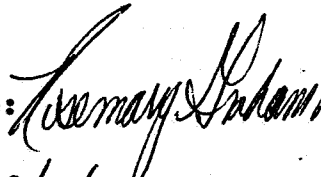
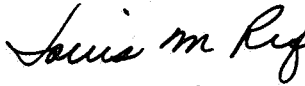
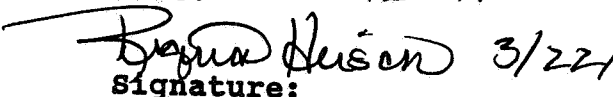
PRODUCT NAME(S) Fenbuconazole, RH7592, Fenethanil, Indar, RH-57,592

COMPANY NAME Rohm and Haas

SUBMISSION PURPOSE Meet EEB Study requirements

SHAUGHNESSY NO.	CHEMICAL & FORMULATION(S)	% A.I.
<u>129011</u>	<u>Fenbuconazole</u>	<u>98.3</u>
_____	<u>Inert</u>	<u>1.7</u>

DATA EVALUATION RECORD

1. **CHEMICAL:** RH-7592/INDAR. Shaughnessey No. 129011.
2. **TEST MATERIAL:** RH-7592 Technical; Lot No. BBP-3-1786R; 96.7% active ingredient; a white powder.
3. **STUDY TYPE:** 72-4. Freshwater Fish Early Life-Stage Toxicity Test. Species Tested: Fathead Minnow (*Pimephales promelas*).
4. **CITATION:** Rhodes, J.E., K. Friesen, and W.A. McAllister. 1991. Early Life-Stage Toxicity of RH-7592 Technical to the Fathead Minnow (*Pimephales promelas*) Under Flow-Through Conditions. ABC Report No. 38142. Rohm and Haas Report No. 89RC-0083. Study conducted by Analytical Bio-Chemistry Laboratories, Inc., Columbia, MO. Submitted by Rohm and Haas, Spring House, PA. EPA MRID No. 418750-08.
5. **REVIEWED BY:**
 Rosemary Graham Mora, M.S.
 Associate Scientist
 KBN Engineering and
 Applied Sciences, Inc.
 Signature: 
 Date: 12/3/92
6. **APPROVED BY:**
 Louis M. Rifici, M.S.
 Associate Scientist
 KBN Engineering and
 Applied Sciences, Inc.
 Signature: 
 Date: 12/4/92
 Henry T. Craven, M.S.
 Supervisor, EEB/EFED
 USEPA
 Signature: 
 Date: 4/14/93
7. **CONCLUSIONS:** This study is ^{not} ~~not~~ scientifically sound ^{but} ~~and~~ does not fulfill the guideline requirements for an early life-stage test using freshwater fish. The %RSD of weight for two control replicates and all solvent control replicates was >40%. The No NOEC was determined by this study since growth was affected at all test levels. Based on mean measured concentrations, the LOEC for *Pimephales promelas* exposed to RH-7592 Technical was 0.28 mg a.i./l.
8. **RECOMMENDATIONS:** N/A.
9. **BACKGROUND:**

10. DISCUSSION OF INDIVIDUAL TESTS: N/A.11. MATERIALS AND METHODS:

- A. Test Animals: Newly fertilized eggs (<24 hours post-fertilization) of the fathead minnow (*Pimephales promelas*) were obtained from the spawning culture at the testing facility.
- B. Test System: The test system was a 2-1 proportional diluter which intermittently delivered test solutions to replicate test chambers. Duplicate glass aquaria were divided into two replicate chambers, each measuring 18 x 20 cm with a water depth of 25 cm, yielding a 9-liter chamber volume. All chamber drains were covered with stainless steel screen. The diluter delivered an average of 81.65 l of solution per day to each replicate chamber resulting in 9.07 volume replacements per day. The test solutions were allowed to flow through the test system for a 48-hour equilibration period before test initiation.

Embryo incubation cups were clear glass jars (9 cm diameter) with Nitex screen bottoms. One cup was suspended in each test chamber. A rocker arm apparatus was used to gently oscillate the incubation cups in the test chambers.

Sixteen hours of light at an intensity of 79.4 ± 9.2 footcandles at the water surface were provided each day. Test temperature was maintained at 23.0-24.6°C by a water bath.

The dilution water was a mixture of untreated and treated (reverse osmosis) well water. The water had a mean pH of 7.8, a specific conductivity of 114-181 S/cm, and a hardness and alkalinity of 42-68 and 50-76 mg/l as CaCO₃, respectively.

Stock solutions (39,400 mg a.i./l) were prepared by dissolving the appropriate amount of whole test material in acetone.

- C. Dosage: Thirty-five-day embryo-larval, flow-through test. Nominal test concentrations selected based on results of preliminary testing were 0.19, 0.38, 0.75, 1.5, and 3.0 mg/l. A dilution water control and solvent control were also included. The solvent control contained an acetone concentration of 0.075

ml/l which corresponds to the highest acetone concentration used in exposure levels 1-5.

- D. **Design:** Four replicates of each treatment and control were included in the test. Duplicate test aquaria per concentration were arranged in one row on one tier using a random number table to assign specific test concentrations, providing a nested experimental design.

Embryos were impartially selected and distributed to the incubation cups in groups of 5 until each cup contained 30 eggs, with the exception of 35 eggs mistakenly added to one replicate. Hatching was 95% complete on test day 5. Fry remained in the incubation cups until test day 11 (day 6 post-hatch) before being released into their respective chambers. Biomass loading was 0.025 g/l/day at test termination.

Starting on test day 4, larvae were fed live brine shrimp nauplii and rotifers daily. Beginning on study day 15, the rotifer supplement was discontinued and beginning on study day 21, a commercial dry food was added to the diet. Frequency of feeding along with quantity and food size was adjusted during the study on the basis of mortality and average fish size. Feeding was discontinued 24 hours prior to test termination. The aquaria were cleaned as needed.

Behavior, appearance, and survival of eggs, embryo, and larvae were observed and recorded daily. Dead individuals were removed at each observation. At test termination (test day 35), the larvae were counted and standard length and blotted wet weight of each individual were measured.

Dissolved oxygen concentration (DO), pH, conductivity, hardness, alkalinity, and temperature were measured on days 0, 1, 7, 14, 21, 28, and 35. Temperature and DO were measured in replicates A and B or C and D on days 0 and 35 and in one replicate chamber of each treatment and control on days 1, 7, 14, 21, and 28. Total hardness and alkalinity, pH, and specific conductance were measured in one replicate of the control, lowest and highest test concentrations containing live fish. Temperature was also measured continuously in a centrally located chamber throughout the test period.

Water samples were collected from each test concentration for the determination of RH-7592 Technical using high performance liquid chromatography

(HPLC). These samples were collected on test days 0, 1, 7, 14, 21, 28, and 35.

- E. **Statistics:** Statistical analyses were based on a $p \leq 0.05$ level of significance. A t-test demonstrated no significant difference between the dilution water control data and solvent control data. Therefore, the pooled control data were used to assess the response of the treatment groups. Shapiro-Wilk normality test statistics were computed within each test concentration to assess departures from normality. When the data suggested departures from normality, the data were examined for indications of central tendency. If the variability between replicates within aquaria was not significant or there was no strong evidence of biological significance, then the aquaria within concentrations and replicate within aquaria error sources were combined.

Egg hatchability and survival data were analyzed using frequency analysis comparing the pooled control responses to each exposure level. Analysis of variance (ANOVA) procedure for nested design experiments, coupled with Dunnett's one-tailed multiple comparison procedure, was used to analyze the growth data.

12. **REPORTED RESULTS:** Mean measured concentrations were 0.28, 0.43, 0.85, 1.7, and 3.4 mg a.i./l (Table 3, attached). These values ranged from 113 to 147% of nominal concentrations.

Sublethal effects (spinal curvature, fish on bottom of chamber, loss of equilibrium, erratic swimming behavior, surfacing) were observed primarily in test concentrations ≥ 0.85 mg a.i./l. Hatching success was not significantly affected at any test concentration when compared to the pooled control data (Table 8, attached). Time to hatch was delayed at 3.4 mg a.i./l. Survival at the two highest test concentrations was significantly reduced when compared to the pooled control data (Table 8, attached). Due to significant effects on larval survival at the two highest test concentrations, data for these test concentrations were excluded from further statistical analysis. Standard length and wet weight were significantly reduced at all remaining test concentrations when compared to the pooled control data (Table 9, attached).

During the study, pH was 7.6-8.0, specific conductance was 114-181 $\mu\text{S}/\text{cm}$, and total hardness and alkalinity were 42-68

and 50-76 mg/l as CaCO₃, respectively. The DO ranged from 7.2 to 8.8 mg/l. The temperature range was 22.5-24.6°C.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**

Based on egg hatchability, fry survival and growth data from this 35-day fathead minnow (*Pimephales promelas*) early life stage study, the Maximum Acceptable Toxicant Concentration (MATC) limits were estimated to be less than 0.28 mg a.i./l. A repeat study using nominal concentrations 0.006, 0.013, 0.025, 0.05, 0.10, 0.20, and 0.40 mg a.i./l is currently underway.

A GLP compliance statement was included in the report indicating that the study was conducted in accordance with EPA Good Laboratory Practice Regulations (40 CFR, Part 160). A quality assurance statement was also included.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

A. **Test Procedure:** The test procedure is generally in accordance with the SEP guidelines, except for the following deviations:

For two replicates in the control and for all replicates of the solvent control, the %RSD for weight was greater than 40%. According to the SEP, a test is unacceptable in the %RSD in any control chamber is greater the 40%.

No NOEC was determined by this study, since growth was affected at all test levels.

During the test, the temperature range was 22.5-24.6°C; the SEP recommends 25 ±2°C.

The report did not indicate the use of 15- to 30-minute dawn/dusk simulation periods as recommended.

The number of male and female fish used to produce the test embryos was not reported; the SEP recommends at least 3 males and 3 females.

Embryos were "impartially" selected and distributed; the SEP requires random selection.

B. **Statistical Analysis:** Individual length and weight data were analyzed using a 2-way ANOVA coupled with Bonferroni's test for treatment comparisons (printouts, attached). The reviewer did not include growth data from the 1.7 mg a.i./l test level in the analysis,

since only one fish from three replicates survived until test termination. The results were the same as those reported by the authors. Length and weight treatment means obtained by the reviewer were slightly different from the authors.

Survival and hatchability data were analyzed using Toxstat® (Version 3.3). The survival (excluding 3.4 mg a.i./l which had 0% survival) and hatchability data met the assumptions of homogeneity of variance and normality when tested using Bartlett's or Hartley tests and Chi-square tests, respectively. Therefore, the survival data were analyzed using William's test and the hatchability data were analyzed using a one-way ANOVA coupled with Dunnett's comparison test (printouts, attached). The reviewer's results were the same as those presented by the authors.

Growth data were individually measured; however, the authors statistically analyzed these data using a one-way ANOVA and the replicate means. When replicate mean values are used, the variation that exists within each replicate is ignored. Individual measurements of growth should have been analyzed using the two-way ANOVA design.

- C. **Discussion/Results:** This study is scientifically sound but does not meet the requirements for an early life-stage toxicity test using freshwater fish. The %RSD of weight for two control replicates and all solvent control replicates was >40%. A treatment effect on growth (length and weight) was noted at all exposure levels, therefore, no MATC or NOEC could be determined. The LOEC was 0.28 mg a.i./l mean measured concentration.

D. **Adequacy of the Study:**

- (1) **Classification:** Supplemental
- (2) **Rationale:** The %RSD for weight was >40% in two control replicates and all solvent control replicates. Failure to determine a NOEC.
- (3) **Repairability:** No.

15. **COMPLETION OF ONE-LINER:** Yes, December 3, 1992.

RIN 3477-95

EEB FENBUCONAZOLE REVIEW

Page _____ is not included in this copy.

Pages 8 through 10 are not included.

The material not included contains the following type of information:

- Identity of product inert ingredients.
- Identity of product impurities.
- Description of the product manufacturing process.
- Description of quality control procedures.
- Identity of the source of product ingredients.
- Sales or other commercial/financial information.
- A draft product label.
- The product confidential statement of formula.
- Information about a pending registration action.
- FIFRA registration data.
- The document is a duplicate of page(s) _____.
- The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

RH-7592 : Fathead Minnow

TRT 1 = DILUTION WATER CONTROL

TRT 2 = Solvent Control

TRT 3 = 0.28 mg a.i./l

TRT 4 = 0.43 mg a.i./l

TRT 5 = 0.85 mg a.i./l

	TRT	REP	LENGTH	WEIGHT	
CASE	1	1.0000	1.0000	20.3000	0.0470
CASE	2	1.0000	1.0000	17.6700	0.0150
CASE	3	1.0000	1.0000	17.0800	0.0740
CASE	4	1.0000	1.0000	19.0200	0.1020
CASE	5	1.0000	1.0000	11.1700	0.0560
CASE	6	1.0000	1.0000	21.9500	0.1560
CASE	7	1.0000	1.0000	19.5800	0.0720
CASE	8	1.0000	1.0000	19.3600	0.0990
CASE	9	1.0000	1.0000	19.3800	0.0760
CASE	10	1.0000	1.0000	14.6700	0.1300
CASE	11	1.0000	1.0000	18.3600	0.0750
CASE	12	1.0000	1.0000	17.0900	0.1030
CASE	13	1.0000	1.0000	16.5800	0.0660
CASE	14	1.0000	1.0000	15.7500	0.0300
CASE	15	1.0000	1.0000	18.7500	0.1590
CASE	16	1.0000	1.0000	16.9800	0.0910
CASE	17	1.0000	1.0000	20.9100	0.0620
CASE	18	1.0000	1.0000	19.9500	0.0930
CASE	19	1.0000	1.0000	15.3000	0.1150
CASE	20	1.0000	1.0000	17.5100	0.1070
CASE	21	1.0000	1.0000	21.4900	0.1120
CASE	22	1.0000	1.0000	18.1800	0.0840
CASE	23	1.0000	1.0000	19.2500	0.1040
CASE	24	1.0000	2.0000	16.9700	0.0760
CASE	25	1.0000	2.0000	17.1600	0.0710
CASE	26	1.0000	2.0000	19.0800	0.0630
CASE	27	1.0000	2.0000	19.8800	0.0520
CASE	28	1.0000	2.0000	17.5700	0.0260
CASE	29	1.0000	2.0000	16.0900	0.0340
CASE	30	1.0000	2.0000	13.8000	0.1000
CASE	31	1.0000	2.0000	20.5000	0.0950
CASE	32	1.0000	2.0000	18.4200	0.0460
CASE	33	1.0000	2.0000	17.8600	0.0940
CASE	34	1.0000	2.0000	12.8500	0.0900
CASE	35	1.0000	2.0000	20.0100	0.1530
CASE	36	1.0000	2.0000	17.3600	0.0760
CASE	37	1.0000	2.0000	19.2700	0.1000
CASE	38	1.0000	2.0000	18.0400	0.0910
CASE	39	1.0000	2.0000	14.7900	0.1210
CASE	40	1.0000	2.0000	18.0200	0.0570
CASE	41	1.0000	2.0000	15.9700	0.1220
CASE	42	1.0000	2.0000	21.5500	0.1140
CASE	43	1.0000	2.0000	17.6300	0.0940
CASE	44	1.0000	2.0000	19.7600	0.0800
CASE	45	1.0000	2.0000	13.7100	0.0530
CASE	46	1.0000	2.0000	19.0500	0.0940
CASE	47	1.0000	2.0000	18.6300	0.0900
CASE	48	1.0000	3.0000	17.6300	0.0480
CASE	49	1.0000	3.0000	18.1300	0.0600
CASE	50	1.0000	3.0000	16.9900	0.0570
CASE	51	1.0000	3.0000	19.6400	0.0630
CASE	52	1.0000	3.0000	21.8200	0.0940
CASE	53	1.0000	3.0000	19.9300	0.1600
CASE	54	1.0000	3.0000	13.1600	0.0830
CASE	55	1.0000	3.0000	21.9900	0.0880
CASE	56	1.0000	3.0000	16.2100	0.0320
CASE	57	1.0000	3.0000	18.7700	0.0560
CASE	58	1.0000	3.0000	15.3100	0.1790

CASE	59	1.0000	3.0000	22.1500	0.1150
CASE	60	1.0000	3.0000	16.5700	0.0640
CASE	61	1.0000	3.0000	12.8700	0.1120
CASE	62	1.0000	3.0000	16.7000	0.0340
CASE	63	1.0000	3.0000	18.8400	0.0850
CASE	64	1.0000	3.0000	13.8500	0.0440
CASE	65	1.0000	3.0000	15.6900	0.0310
CASE	66	1.0000	3.0000	17.4600	0.0880
CASE	67	1.0000	3.0000	15.1800	0.1080
CASE	68	1.0000	3.0000	15.0500	0.0820
CASE	69	1.0000	3.0000	18.3600	0.1690
CASE	70	1.0000	4.0000	18.7600	0.0030
CASE	71	1.0000	4.0000	8.8400	0.0630
CASE	72	1.0000	4.0000	16.0500	0.1160
CASE	73	1.0000	4.0000	18.0700	0.0660
CASE	74	1.0000	4.0000	16.9300	0.0800
CASE	75	1.0000	4.0000	19.6700	0.0950
CASE	76	1.0000	4.0000	20.4400	0.1060
CASE	77	1.0000	4.0000	16.9600	0.1700
CASE	78	1.0000	4.0000	13.0200	0.0910
CASE	79	1.0000	4.0000	17.1200	0.1660
CASE	80	1.0000	4.0000	19.6800	0.0710
CASE	81	1.0000	4.0000	18.1500	0.1000
CASE	82	1.0000	4.0000	13.4100	0.0730
CASE	83	1.0000	4.0000	22.8300	0.0740
CASE	84	1.0000	4.0000	14.8000	0.0340
CASE	85	1.0000	4.0000	15.0600	0.0770
CASE	86	1.0000	4.0000	19.2500	0.0670
CASE	87	1.0000	4.0000	13.7400	0.0480
CASE	88	1.0000	4.0000	18.2600	0.0810
CASE	89	1.0000	4.0000	19.1400	0.0590
CASE	90	1.0000	4.0000	17.8400	0.1230
CASE	91	1.0000	4.0000	16.5800	0.0430
CASE	92	1.0000	4.0000	22.1100	0.0300
CASE	93	1.0000	4.0000	16.9800	0.0940
CASE	94	1.0000	4.0000	18.7400	0.0250
CASE	95	2.0000	1.0000	18.3200	0.0120
CASE	96	2.0000	1.0000	14.2800	0.1170
CASE	97	2.0000	1.0000	18.3600	0.0930
CASE	98	2.0000	1.0000	16.2900	0.0640
CASE	99	2.0000	1.0000	22.2600	0.1450
CASE	100	2.0000	1.0000	21.2900	0.1000
CASE	101	2.0000	1.0000	19.7600	0.1440
CASE	102	2.0000	1.0000	21.1800	0.0410
CASE	103	2.0000	1.0000	18.1500	0.0540
CASE	104	2.0000	1.0000	17.7300	0.1420
CASE	105	2.0000	1.0000	20.9200	0.1000
CASE	106	2.0000	1.0000	8.7800	0.0910
CASE	107	2.0000	1.0000	10.4500	0.1020
CASE	108	2.0000	1.0000	18.4400	0.0730
CASE	109	2.0000	1.0000	16.5900	0.0890
CASE	110	2.0000	1.0000	16.7000	0.0730
CASE	111	2.0000	1.0000	18.5700	0.0800
CASE	112	2.0000	1.0000	21.1500	0.0750
CASE	113	2.0000	1.0000	15.4800	0.0050
CASE	114	2.0000	1.0000	18.7800	0.0770
CASE	115	2.0000	1.0000	20.5400	0.1660
CASE	116	2.0000	1.0000	16.5100	0.1290
CASE	117	2.0000	2.0000	15.4800	0.0130
CASE	118	2.0000	2.0000	17.0800	0.0510
CASE	119	2.0000	2.0000	17.4700	0.0540
CASE	120	2.0000	2.0000	15.1300	0.0690
CASE	121	2.0000	2.0000	20.9600	0.0840
CASE	122	2.0000	2.0000	19.0900	0.1090
CASE	123	2.0000	2.0000	16.1400	0.0470
CASE	124	2.0000	2.0000	20.2100	0.0740
CASE	125	2.0000	2.0000	21.8100	0.1350
CASE	126	2.0000	2.0000	15.0400	0.1310
CASE	127	2.0000	2.0000	17.2700	0.0740
CASE	128	2.0000	2.0000	16.4500	0.0600
CASE	129	2.0000	2.0000	18.9000	0.0470
CASE	130	2.0000	2.0000	14.5900	0.0330

CASE	131	2.0000	2.0000	10.2900	0.0680
CASE	132	2.0000	2.0000	18.2300	0.1390
CASE	133	2.0000	2.0000	14.6600	0.1570
CASE	134	2.0000	2.0000	22.0600	0.1380
CASE	135	2.0000	2.0000	17.9000	0.0930
CASE	136	2.0000	2.0000	20.1600	0.0430
CASE	137	2.0000	2.0000	15.5800	0.0880
CASE	138	2.0000	2.0000	17.0800	0.0890
CASE	139	2.0000	2.0000	19.7200	0.0940
CASE	140	2.0000	3.0000	14.4000	0.0200
CASE	141	2.0000	3.0000	19.2600	0.1050
CASE	142	2.0000	3.0000	18.2400	0.0770
CASE	143	2.0000	3.0000	21.1600	0.1440
CASE	144	2.0000	3.0000	18.8900	0.1350
CASE	145	2.0000	3.0000	11.3400	0.0850
CASE	146	2.0000	3.0000	20.2000	0.1510
CASE	147	2.0000	3.0000	18.8700	0.0400
CASE	148	2.0000	3.0000	17.5100	0.1160
CASE	149	2.0000	3.0000	12.9600	0.1100
CASE	150	2.0000	3.0000	21.9400	0.1410
CASE	151	2.0000	3.0000	21.9900	0.0810
CASE	152	2.0000	3.0000	19.2000	0.0140
CASE	153	2.0000	3.0000	18.8700	0.0770
CASE	154	2.0000	3.0000	21.4200	0.1410
CASE	155	2.0000	3.0000	17.6500	0.0580
CASE	156	2.0000	3.0000	22.0700	0.0940
CASE	157	2.0000	3.0000	19.3600	0.1090
CASE	158	2.0000	3.0000	17.1200	0.1600
CASE	159	2.0000	3.0000	21.2200	0.1000
CASE	160	2.0000	4.0000	9.9200	0.0270
CASE	161	2.0000	4.0000	17.1300	0.0860
CASE	162	2.0000	4.0000	13.7700	0.1260
CASE	163	2.0000	4.0000	12.4700	0.0840
CASE	164	2.0000	4.0000	15.2000	0.0630
CASE	165	2.0000	4.0000	18.2400	0.0050
CASE	166	2.0000	4.0000	15.0600	0.0500
CASE	167	2.0000	4.0000	13.8500	0.0170
CASE	168	2.0000	4.0000	17.3800	0.1170
CASE	169	2.0000	4.0000	20.2600	0.0710
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CASE	172	2.0000	4.0000	15.5600	0.1360
CASE	173	2.0000	4.0000	21.5700	0.0360
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CASE	177	2.0000	4.0000	17.8500	0.0730
CASE	178	3.0000	1.0000	19.6300	0.0160
CASE	179	3.0000	1.0000	16.4400	0.0150
CASE	180	3.0000	1.0000	21.2100	0.0140
CASE	181	3.0000	1.0000	11.4800	0.0180
CASE	182	3.0000	1.0000	11.6100	0.0560
CASE	183	3.0000	1.0000	17.9700	0.0810
CASE	184	3.0000	1.0000	13.8200	0.0470
CASE	185	3.0000	1.0000	15.7100	0.0740
CASE	186	3.0000	1.0000	17.3400	0.1420
CASE	187	3.0000	1.0000	11.2500	0.0360
CASE	188	3.0000	1.0000	14.5600	0.0660
CASE	189	3.0000	1.0000	16.3400	0.0540
CASE	190	3.0000	1.0000	17.8500	0.0400
CASE	191	3.0000	1.0000	15.6700	0.0590
CASE	192	3.0000	1.0000	16.1000	0.0730
CASE	193	3.0000	1.0000	17.7200	0.0870
CASE	194	3.0000	1.0000	18.0000	0.0650
CASE	195	3.0000	1.0000	17.9500	0.0620
CASE	196	3.0000	1.0000	16.4100	0.0830
CASE	197	3.0000	1.0000	21.0400	0.0730
CASE	198	3.0000	1.0000	12.7700	0.0670
CASE	199	3.0000	1.0000	16.1900	0.0500
CASE	200	3.0000	1.0000	10.1700	0.0310
CASE	201	3.0000	1.0000	17.9800	0.1100
CASE	202	3.0000	1.0000	16.8100	0.1290

CASE	203	3.0000	2.0000	16.7300	0.0230
CASE	204	3.0000	2.0000	15.8600	0.0860
CASE	205	3.0000	2.0000	15.5200	0.0590
CASE	206	3.0000	2.0000	17.9000	0.0610
CASE	207	3.0000	2.0000	17.7000	0.0500
CASE	208	3.0000	2.0000	20.0100	0.0500
CASE	209	3.0000	2.0000	11.5400	0.0740
CASE	210	3.0000	2.0000	19.1300	0.0660
CASE	211	3.0000	2.0000	17.1100	0.0150
CASE	212	3.0000	2.0000	15.2000	0.1020
CASE	213	3.0000	2.0000	14.6100	0.0360
CASE	214	3.0000	2.0000	16.3700	0.1040
CASE	215	3.0000	2.0000	17.3300	0.1000
CASE	216	3.0000	2.0000	17.9000	0.0650
CASE	217	3.0000	2.0000	14.1800	0.0970
CASE	218	3.0000	2.0000	13.5900	0.1100
CASE	219	3.0000	2.0000	19.6300	0.0570
CASE	220	3.0000	2.0000	16.0900	0.0580
CASE	221	3.0000	2.0000	14.7900	0.0580
CASE	222	3.0000	2.0000	16.9600	0.0450
CASE	223	3.0000	2.0000	15.8300	0.0260
CASE	224	3.0000	2.0000	11.6400	0.0750
CASE	225	3.0000	2.0000	20.5000	0.0370
CASE	226	3.0000	2.0000	18.0300	0.0850
CASE	227	3.0000	2.0000	18.5000	0.0770
CASE	228	3.0000	2.0000	16.1900	0.0580
CASE	229	3.0000	3.0000	16.0600	0.0330
CASE	230	3.0000	3.0000	17.2300	0.0180
CASE	231	3.0000	3.0000	16.3200	0.0250
CASE	232	3.0000	3.0000	12.4100	0.0880
CASE	233	3.0000	3.0000	13.7700	0.0330
CASE	234	3.0000	3.0000	13.5500	0.0750
CASE	235	3.0000	3.0000	15.4300	0.0880
CASE	236	3.0000	3.0000	19.4600	0.0750
CASE	237	3.0000	3.0000	18.5200	0.1010
CASE	238	3.0000	3.0000	18.4900	0.0240
CASE	239	3.0000	3.0000	12.7600	0.0630
CASE	240	3.0000	3.0000	13.2900	0.0500
CASE	241	3.0000	3.0000	16.4500	0.0640
CASE	242	3.0000	3.0000	18.1000	0.0720
CASE	243	3.0000	3.0000	18.3600	0.0280
CASE	244	3.0000	3.0000	18.5200	0.0870
CASE	245	3.0000	3.0000	21.3400	0.0930
CASE	246	3.0000	3.0000	17.3300	0.0580
CASE	247	3.0000	3.0000	17.8700	0.0800
CASE	248	3.0000	3.0000	11.7200	0.0590
CASE	249	3.0000	3.0000	17.4800	0.0730
CASE	250	3.0000	3.0000	13.1300	0.0780
CASE	251	3.0000	3.0000	17.2000	0.0460
CASE	252	3.0000	3.0000	15.3000	0.1450
CASE	253	3.0000	3.0000	18.4900	0.0200
CASE	254	3.0000	3.0000	19.6300	0.0630
CASE	255	3.0000	4.0000	20.9300	0.0430
CASE	256	3.0000	4.0000	14.6000	0.0660
CASE	257	3.0000	4.0000	17.0400	0.0470
CASE	258	3.0000	4.0000	15.8400	0.0390
CASE	259	3.0000	4.0000	17.5900	0.0690
CASE	260	3.0000	4.0000	16.1900	0.0450
CASE	261	3.0000	4.0000	14.8800	0.0400
CASE	262	3.0000	4.0000	16.4500	0.0680
CASE	263	3.0000	4.0000	13.8800	0.0500
CASE	264	3.0000	4.0000	19.6400	0.0470
CASE	265	3.0000	4.0000	16.1200	0.0940
CASE	266	3.0000	4.0000	18.2300	0.0500
CASE	267	3.0000	4.0000	14.7100	0.1340
CASE	268	3.0000	4.0000	16.0300	0.1090
CASE	269	3.0000	4.0000	14.8300	0.0390
CASE	270	3.0000	4.0000	14.6700	0.0320
CASE	271	3.0000	4.0000	14.7900	0.0580
CASE	272	4.0000	1.0000	16.0300	0.0140
CASE	273	4.0000	1.0000	15.6100	0.0610
CASE	274	4.0000	1.0000	19.3000	0.0630

CASE 275	4.0000	1.0000	16.6300	0.0670
CASE 276	4.0000	1.0000	15.5800	0.0490
CASE 277	4.0000	1.0000	18.1400	0.0460
CASE 278	4.0000	1.0000	18.7100	0.0330
CASE 279	4.0000	1.0000	16.3200	0.1050
CASE 280	4.0000	1.0000	16.3300	0.1430
CASE 281	4.0000	1.0000	12.6500	0.0710
CASE 282	4.0000	1.0000	19.5100	0.0740
CASE 283	4.0000	1.0000	16.6000	0.0610
CASE 284	4.0000	1.0000	9.9300	0.0920
CASE 285	4.0000	1.0000	17.7400	0.0890
CASE 286	4.0000	1.0000	15.9100	0.1050
CASE 287	4.0000	1.0000	18.0400	0.0870
CASE 288	4.0000	1.0000	20.5700	0.0690
CASE 289	4.0000	1.0000	16.8300	0.0710
CASE 290	4.0000	1.0000	16.7900	0.1060
CASE 291	4.0000	1.0000	15.8300	0.0630
CASE 292	4.0000	1.0000	17.9800	0.0960
CASE 293	4.0000	1.0000	18.3600	0.0450
CASE 294	4.0000	1.0000	14.8800	0.0690
CASE 295	4.0000	1.0000	17.3800	0.0620
CASE 296	4.0000	2.0000	15.7200	0.0820
CASE 297	4.0000	2.0000	13.9800	0.0340
CASE 298	4.0000	2.0000	14.0300	0.0410
CASE 299	4.0000	2.0000	15.1800	0.0470
CASE 300	4.0000	2.0000	13.2300	0.0350
CASE 301	4.0000	2.0000	14.4100	0.0390
CASE 302	4.0000	2.0000	18.0400	0.0950
CASE 303	4.0000	2.0000	17.7600	0.0940
CASE 304	4.0000	2.0000	16.8700	0.0600
CASE 305	4.0000	2.0000	14.7700	0.0740
CASE 306	4.0000	2.0000	19.3900	0.0480
CASE 307	4.0000	2.0000	17.0800	0.0830
CASE 308	4.0000	2.0000	9.6100	0.0100
CASE 309	4.0000	2.0000	11.3500	0.0820
CASE 310	4.0000	2.0000	16.0700	0.0640
CASE 311	4.0000	2.0000	10.8300	0.1070
CASE 312	4.0000	2.0000	17.9300	0.0440
CASE 313	4.0000	2.0000	15.2000	0.0500
CASE 314	4.0000	2.0000	8.6700	0.0140
CASE 315	4.0000	2.0000	14.2700	0.1080
CASE 316	4.0000	2.0000	14.5900	0.0450
CASE 317	4.0000	2.0000	17.4700	0.0410
CASE 318	4.0000	2.0000	18.2800	0.0120
CASE 319	4.0000	2.0000	12.9100	0.0650
CASE 320	4.0000	2.0000	18.7000	0.0770
CASE 321	4.0000	2.0000	17.6500	0.0740
CASE 322	4.0000	2.0000	15.9400	0.0090
CASE 323	4.0000	3.0000	15.4300	0.0830
CASE 324	4.0000	3.0000	16.9600	0.0640
CASE 325	4.0000	3.0000	12.3700	0.0650
CASE 326	4.0000	3.0000	14.6600	0.0550
CASE 327	4.0000	3.0000	14.0800	0.0180
CASE 328	4.0000	3.0000	16.8300	0.0550
CASE 329	4.0000	3.0000	11.6900	0.0320
CASE 330	4.0000	3.0000	16.5800	0.0320
CASE 331	4.0000	3.0000	16.5700	0.0840
CASE 332	4.0000	3.0000	15.4600	0.0650
CASE 333	4.0000	3.0000	13.9300	0.0650
CASE 334	4.0000	3.0000	17.9500	0.0580
CASE 335	4.0000	3.0000	15.3900	0.0210
CASE 336	4.0000	3.0000	18.0000	0.0330
CASE 337	4.0000	3.0000	16.2100	0.0360
CASE 338	4.0000	3.0000	11.3000	0.0690
CASE 339	4.0000	3.0000	11.3800	0.0310
CASE 340	4.0000	3.0000	8.1100	0.0090
CASE 341	4.0000	3.0000	16.7200	0.0860
CASE 342	4.0000	3.0000	15.5400	0.0090
CASE 343	4.0000	3.0000	17.1000	0.0780
CASE 344	4.0000	3.0000	13.8500	0.0560
CASE 345	4.0000	3.0000	13.5600	0.0620
CASE 346	4.0000	3.0000	19.9100	0.0640

CASE 347	4.0000	3.0000	17.1200	0.0390
CASE 348	4.0000	3.0000	17.9700	0.0880
CASE 349	4.0000	3.0000	13.4200	0.0270
CASE 350	4.0000	3.0000	17.4600	0.0720
CASE 351	4.0000	3.0000	16.0600	0.0520
CASE 352	4.0000	4.0000	17.2700	0.0520
CASE 353	4.0000	4.0000	17.7400	0.0630
CASE 354	4.0000	4.0000	16.8700	0.0810
CASE 355	4.0000	4.0000	15.0400	0.0880
CASE 356	4.0000	4.0000	13.0300	0.0270
CASE 357	4.0000	4.0000	16.5800	0.0490
CASE 358	4.0000	4.0000	19.4000	0.0030
CASE 359	4.0000	4.0000	15.8300	0.0350
CASE 360	4.0000	4.0000	18.0100	0.0180
CASE 361	4.0000	4.0000	13.3000	0.0240
CASE 362	4.0000	4.0000	19.2000	0.0730
CASE 363	4.0000	4.0000	12.4000	0.0790
CASE 364	4.0000	4.0000	9.5000	0.0690
CASE 365	4.0000	4.0000	15.9300	0.0630
CASE 366	4.0000	4.0000	18.2400	0.0230
CASE 367	4.0000	4.0000	14.4200	0.0350
CASE 368	4.0000	4.0000	16.3300	0.0680
CASE 369	4.0000	4.0000	15.7700	0.0670
CASE 370	4.0000	4.0000	16.1700	0.0630
CASE 371	4.0000	4.0000	10.6200	0.0520
CASE 372	4.0000	4.0000	13.9000	0.0950
CASE 373	4.0000	4.0000	16.8400	0.0500
CASE 374	4.0000	4.0000	16.7700	0.1120
CASE 375	4.0000	4.0000	16.6200	0.0250
CASE 376	4.0000	4.0000	12.2500	0.1010
CASE 377	4.0000	4.0000	16.9000	0.0610
CASE 378	4.0000	4.0000	14.2200	0.0590
CASE 379	5.0000	1.0000	11.0900	0.0260
CASE 380	5.0000	1.0000	9.6900	0.0110
CASE 381	5.0000	1.0000	13.3300	0.0420
CASE 382	5.0000	1.0000	12.2200	0.0060
CASE 383	5.0000	1.0000	15.3900	0.0050
CASE 384	5.0000	1.0000	11.6100	0.0080
CASE 385	5.0000	1.0000	8.1700	0.0150
CASE 386	5.0000	1.0000	12.9700	0.0240
CASE 387	5.0000	1.0000	14.4700	0.0230
CASE 388	5.0000	1.0000	9.8900	0.0400
CASE 389	5.0000	1.0000	13.4000	0.0450
CASE 390	5.0000	1.0000	14.1100	0.0280
CASE 391	5.0000	1.0000	8.4500	0.0060
CASE 392	5.0000	1.0000	9.8800	0.0560
CASE 393	5.0000	1.0000	12.6200	0.0160
CASE 394	5.0000	1.0000	8.9500	0.0210
CASE 395	5.0000	1.0000	7.1500	0.0290
CASE 396	5.0000	2.0000	11.1900	0.0070
CASE 397	5.0000	2.0000	8.5700	0.0120
CASE 398	5.0000	2.0000	13.0300	0.0150
CASE 399	5.0000	2.0000	11.6800	0.0270
CASE 400	5.0000	2.0000	11.4500	0.0120
CASE 401	5.0000	2.0000	12.9800	0.0310
CASE 402	5.0000	2.0000	15.7400	0.0120
CASE 403	5.0000	2.0000	9.2000	0.0115
CASE 404	5.0000	2.0000	11.6000	0.0040
CASE 405	5.0000	2.0000	14.8300	0.0260
CASE 406	5.0000	2.0000	8.0600	0.0340
CASE 407	5.0000	2.0000	7.7300	0.0040
CASE 408	5.0000	2.0000	8.6000	0.0180
CASE 409	5.0000	2.0000	10.6000	0.0150
CASE 410	5.0000	2.0000	8.2600	0.0510
CASE 411	5.0000	2.0000	10.9000	0.0180
CASE 412	5.0000	2.0000	12.7500	0.0180
CASE 413	5.0000	2.0000	10.5000	0.0080
CASE 414	5.0000	2.0000	13.3300	0.0550
CASE 415	5.0000	3.0000	8.4100	0.0040
CASE 416	5.0000	3.0000	8.6000	0.0050
CASE 417	5.0000	3.0000	10.2500	0.0050
CASE 418	5.0000	3.0000	10.7300	0.0100

CASE 419	5.0000	3.0000	12.8100	0.0310
CASE 420	5.0000	3.0000	7.9000	0.0100
CASE 421	5.0000	3.0000	8.4700	0.0160
CASE 422	5.0000	3.0000	11.3500	0.0090
CASE 423	5.0000	3.0000	12.8300	0.0230
CASE 424	5.0000	3.0000	11.0800	0.0170
CASE 425	5.0000	3.0000	12.9700	0.0480
CASE 426	5.0000	3.0000	11.2900	0.0090
CASE 427	5.0000	3.0000	13.3000	0.0060
CASE 428	5.0000	3.0000	9.3700	0.0200
CASE 429	5.0000	3.0000	14.3000	0.0240
CASE 430	5.0000	3.0000	11.6000	0.0150
CASE 431	5.0000	3.0000	13.0400	0.0340
CASE 432	5.0000	3.0000	10.6000	0.0320
CASE 433	5.0000	3.0000	10.2500	0.0210
CASE 434	5.0000	3.0000	8.9700	0.0260
CASE 435	5.0000	3.0000	8.4400	0.0300
CASE 436	5.0000	3.0000	10.6100	0.0310
CASE 437	5.0000	3.0000	11.9800	0.0120
CASE 438	5.0000	3.0000	14.5400	0.0550
CASE 439	5.0000	3.0000	15.2200	0.0250
CASE 440	5.0000	3.0000	12.8300	0.0050
CASE 441	5.0000	4.0000	9.5200	0.0080
CASE 442	5.0000	4.0000	8.5700	0.0100
CASE 443	5.0000	4.0000	9.9000	0.0060
CASE 444	5.0000	4.0000	16.6800	0.0080
CASE 445	5.0000	4.0000	8.0700	0.0110
CASE 446	5.0000	4.0000	15.4300	0.0470
CASE 447	5.0000	4.0000	15.6800	0.0480
CASE 448	5.0000	4.0000	11.6000	0.0260
CASE 449	5.0000	4.0000	8.8900	0.0280
CASE 450	5.0000	4.0000	11.4800	0.0350
CASE 451	5.0000	4.0000	8.6500	0.0170
CASE 452	5.0000	4.0000	10.2000	0.0130
CASE 453	5.0000	4.0000	15.8800	0.0230
CASE 454	5.0000	4.0000	10.9100	0.0210
CASE 455	5.0000	4.0000	10.1000	0.0180
CASE 456	5.0000	4.0000	12.3200	0.0030
CASE 457	5.0000	4.0000	8.5500	0.0070
CASE 458	5.0000	4.0000	13.0000	0.0490
CASE 459	5.0000	4.0000	12.7600	0.0260
CASE 460	5.0000	4.0000	13.0200	0.0580
CASE 461	5.0000	4.0000	14.5400	0.0100
CASE 462	5.0000	4.0000	10.4900	0.0290
CASE 463	5.0000	4.0000	8.5600	0.0330
CASE 464	5.0000	4.0000	10.7300	0.0160
CASE 465	5.0000	4.0000	8.3000	0.0460

RH-7592 : Fathead Minnow

ANOVA on Weights

LEVELS ENCOUNTERED DURING PROCESSING ARE:

TRT	1.0000	2.0000	3.0000	4.0000	5.0000
REP	1.0000	2.0000	3.0000	4.0000	

DEP VAR: WEIGHT N: 465 MULTIPLE R: 0.608 SQUARED MULTIPLE R: 0.369

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
TRT	0.2262	4	0.0566	59.8084	0.0000
REP	0.0042	3	0.0014	1.4779	0.2198
TRT*REP	0.0097	12	0.0008	0.8557	0.5927
ERROR	0.4208	445	0.0009		

Post-hoc pairwise comparison of weight/Bonferroni.

COL/ ROW	TRT
1	1.0000
2	2.0000
3	3.0000
4	4.0000
5	5.0000

USING LEAST SQUARES MEANS.

POST HOC TEST OF WEIGHT

MATRIX OF PAIRWISE MEAN DIFFERENCES:

	1	2	3	4	5
1	0.0000				
2	0.0026	0.0000			
3	-0.0209	-0.0235	0.0000		
4	-0.0238	-0.0264	-0.0029	0.0000	
5	-0.0615	-0.0641	-0.0406	-0.0377	0.0000

BONFERRONI ADJUSTMENT.

MATRIX OF PAIRWISE COMPARISON PROBABILITIES:

	1	2	3	4	5
1	1.0000				
2	1.0000	1.0000			
3	0.0001	0.0000	1.0000		
4	0.0000	0.0000	1.0000	1.0000	
5	0.0000	0.0000	0.0000	0.0000	1.0000

RH-7592 : Fathead Minnow

ANOVA on Lengths

LEVELS ENCOUNTERED DURING PROCESSING ARE:

TRT	1.0000	2.0000	3.0000	4.0000	5.0000
REP	1.0000	2.0000	3.0000	4.0000	

DEP VAR: LENGTH N: 465 MULTIPLE R: 0.673 SQUARED MULTIPLE R: 0.453

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
TRT	2361.7527	4	590.4382	86.5899	0.0000
REP	19.0705	3	6.3568	0.9323	0.4250
TRT*REP	67.0665	12	5.5889	0.8196	0.6302
ERROR	3034.3607	445	6.8188		

Post-hoc pairwise comparison of length/Bonferroni.

COL/ ROW	TRT
1	1.0000
2	2.0000
3	3.0000
4	4.0000
5	5.0000

USING LEAST SQUARES MEANS.

POST HOC TEST OF LENGTH

MATRIX OF PAIRWISE MEAN DIFFERENCES:

	1	2	3	4	5
1	0.0000				
2	0.0841	0.0000			
3	-1.2837	-1.3678	0.0000		
4	-1.9423	-2.0264	-0.6586	0.0000	
5	-6.3460	-6.4301	-5.0623	-4.4037	0.0000

BONFERRONI ADJUSTMENT.

MATRIX OF PAIRWISE COMPARISON PROBABILITIES:

	1	2	3	4	5
1	1.0000				
2	1.0000	1.0000			
3	0.0090	0.0063	1.0000		
4	0.0000	0.0000	0.7793	1.0000	
5	0.0000	0.0000	0.0000	0.0000	1.0000

RH-7592 : Fathead Minnow

THE FOLLOWING RESULTS ARE FOR:

TRT = 1.0000

TOTAL OBSERVATIONS: 94

	WEIGHT	LENGTH
N OF CASES	94	94
MINIMUM	0.0030	8.8400
MAXIMUM	0.1790	22.8300
MEAN	0.0833	17.6062
STANDARD DEV	0.0366	2.5932

RSD =

43.9

THE FOLLOWING RESULTS ARE FOR:

TRT = 2.0000

TOTAL OBSERVATIONS: 83

	WEIGHT	LENGTH
N OF CASES	83	83
MINIMUM	0.0050	8.7800
MAXIMUM	0.1660	22.2600
MEAN	0.0862	17.7057
STANDARD DEV	0.0406	3.0581

RSD =

47.1

THE FOLLOWING RESULTS ARE FOR:

TRT = 3.0000

TOTAL OBSERVATIONS: 94

	WEIGHT	LENGTH
N OF CASES	94	94
MINIMUM	0.0140	10.1700
MAXIMUM	0.1450	21.3400
MEAN	0.0627	16.3350
STANDARD DEV	0.0289	2.4528

THE FOLLOWING RESULTS ARE FOR:

TRT = 4.0000

TOTAL OBSERVATIONS: 107

	WEIGHT	LENGTH
N OF CASES	107	107
MINIMUM	0.0030	8.1100
MAXIMUM	0.1430	20.5700
MEAN	0.0590	15.6293
STANDARD DEV	0.0273	2.5640

THE FOLLOWING RESULTS ARE FOR:

TRT = 5.0000

TOTAL OBSERVATIONS: 87

	WEIGHT	LENGTH
N OF CASES	87	87
MINIMUM	0.0030	7.1500
MAXIMUM	0.0580	16.6800
MEAN	0.0218	11.2639
STANDARD DEV	0.0145	2.3404

KOLMOGOROV-SMIRNOV ONE SAMPLE TEST USING STANDARD NORMAL DISTRIBUTION

VARIABLE	N-OF-CASES	MAXDIF	PROBABILITY (2-TAIL)
WEIGHT	465.0000	0.5012	0.0000
LENGTH	465.0000	1.0000	0.0000

RH-7592: Survival of Exposed FHM Larvae
File: try Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	6	13	5	0

Calculated Chi-Square goodness of fit test statistic = 4.9364
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

RH-7592: Survival of Exposed FHM Larvae
File: try Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 37.50
Closest, conservative, Table H statistic = 184.0 (alpha = 0.01)

Used for Table H ==> R (# groups) = 6, df (# reps-1) = 3
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 3.00

Data PASS homogeneity test. Continue analysis.

NOTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used as an approximate test (average df are used).

TITLE: RH-7592: Survival of Exposed FHM Larvae
FILE: try
TRANSFORM: NO TRANSFORMATION

NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Solvent Control	1	0.9200	0.9200
1	Solvent Control	2	0.9600	0.9600
1	Solvent Control	3	0.8700	0.8700
1	Solvent Control	4	0.7200	0.7200
2	Control	1	0.9200	0.9200
2	Control	2	0.8900	0.8900
2	Control	3	0.8500	0.8500
2	Control	4	0.9600	0.9600
3	0.28 mg ai/l	1	0.9300	0.9300
3	0.28 mg ai/l	2	0.8700	0.8700
3	0.28 mg ai/l	3	1.0000	1.0000
3	0.28 mg ai/l	4	0.7700	0.7700
4	0.43 mg ai/l	1	0.9200	0.9200
4	0.43 mg ai/l	2	0.9600	0.9600
4	0.43 mg ai/l	3	1.0000	1.0000
4	0.43 mg ai/l	4	0.9600	0.9600
5	0.85 mg ai/l	1	0.6500	0.6500
5	0.85 mg ai/l	2	0.7900	0.7900
5	0.85 mg ai/l	3	0.9300	0.9300
5	0.85 mg ai/l	4	0.8600	0.8600
6	1.7 mg ai/l	1	0.0000	0.0000
6	1.7 mg ai/l	2	0.4000	0.4000
6	1.7 mg ai/l	3	0.4000	0.4000
6	1.7 mg ai/l	4	0.4000	0.4000

RH-7592: Survival of Exposed FHM Larvae
 File: try Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent Control	4	0.868	0.868	0.906
2	Control	4	0.905	0.905	0.906
3	0.28 mg ai/l	4	0.893	0.893	0.906
4	0.43 mg ai/l	4	0.960	0.960	0.906
5	0.85 mg ai/l	4	0.808	0.808	0.808
6	1.7 mg ai/l	4	0.300	0.300	0.300

RH-7592: Survival of Exposed FHM Larvae
 File: try 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 Control	0.906				
Control	0.906	0.480		1.73	k= 1, v=18
0.28 mg ai/l	0.906	0.480		1.82	k= 2, v=18
0.43 mg ai/l	0.906	0.480		1.85	k= 3, v=18
0.85 mg ai/l	0.808	0.744		1.86	k= 4, v=18
1.7 mg ai/l	0.300	7.036	*	1.87	k= 5, v=18

s = 0.114

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

RH-7592: Hatchability of Exposed FHM Embryos
File: 41875008.hat Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro Wilks test for normality

D = 0.170

W = 0.954

Critical W (P = 0.05) (n = 28) = 0.924

Critical W (P = 0.01) (n = 28) = 0.896

Data PASS normality test at P=0.01 level. Continue analysis.

RH-7592: Hatchability of Exposed FHM Embryos
File: 41875008.hat Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's test for homogeneity of variance

Calculated B statistic = 6.66
Table Chi-square value = 16.81 (alpha = 0.01)
Table Chi-square value = 12.59 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 6

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: RH-7592: Hatchability of Exposed FHM Embryos
FILE: 41875008.sh
TRANSFORM: NO TRANSFORMATION

NUMBER OF GROUPS: 7

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Solvent Control	1	0.8000	0.8000
1	Solvent Control	2	0.8000	0.8000
1	Solvent Control	3	0.7700	0.7700
1	Solvent Control	4	0.8300	0.8300
2	Control	1	0.8300	0.8300
2	Control	2	0.9000	0.9000
2	Control	3	0.8700	0.8700
2	Control	4	0.8700	0.8700
3	0.28 mg ai/l	1	0.9000	0.9000
3	0.28 mg ai/l	2	0.8600	0.8600
3	0.28 mg ai/l	3	0.8700	0.8700
3	0.28 mg ai/l	4	0.7300	0.7300
4	0.43 mg ai/l	1	0.8700	0.8700
4	0.43 mg ai/l	2	0.9300	0.9300
4	0.43 mg ai/l	3	0.9700	0.9700
4	0.43 mg ai/l	4	0.9300	0.9300
5	0.85 mg ai/l	1	0.8700	0.8700
5	0.85 mg ai/l	2	0.8000	0.8000
5	0.85 mg ai/l	3	0.9300	0.9300
5	0.85 mg ai/l	4	0.9700	0.9700
6	1.7 mg ai/l	1	0.8000	0.8000
6	1.7 mg ai/l	2	0.9000	0.9000
6	1.7 mg ai/l	3	0.8300	0.8300
6	1.7 mg ai/l	4	0.9300	0.9300
7	3.4 mg ai/l	1	0.8000	0.8000
7	3.4 mg ai/l	2	0.6700	0.6700
7	3.4 mg ai/l	3	0.9000	0.9000
7	3.4 mg ai/l	4	0.8000	0.8000

RH-7592: Hatchability of Exposed FHM Embryos
File: 41875008.sh Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	0.055	0.009	2.388
Within (Error)	21	0.080	0.004	
Total	27	0.135		

Critical F value = 2.57 (0.05,6,21)
Since $F < \text{Critical } F$ FAIL TO REJECT H_0 :All groups equal

RH-7592: Hatchability of Exposed FHM Embryos
 File: 41875008.sh Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Solvent Control	0.800	0.800		
2	Control	0.867	0.867	-1.543	
3	0.28 mg ai/l	0.840	0.840	-0.914	
4	0.43 mg ai/l	0.925	0.925	-2.857	
5	0.85 mg ai/l	0.893	0.893	-2.114	
6	1.7 mg ai/l	0.865	0.865	-1.485	
7	3.4 mg ai/l	0.793	0.793	0.171	

Dunnett table value = 2.46 (1 Tailed Value, P=0.05, df=20,6)

RH-7592: Hatchability of Exposed FHM Embryos
 File: 41875008.sh Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Solvent Control	4			
2	Control	4	0.108	13.5	-0.067
3	0.28 mg ai/l	4	0.108	13.5	-0.040
4	0.43 mg ai/l	4	0.108	13.5	-0.125
5	0.85 mg ai/l	4	0.108	13.5	-0.092
6	1.7 mg ai/l	4	0.108	13.5	-0.065
7	3.4 mg ai/l	4	0.108	13.5	0.008

**DATABASE ENTRY FORM
FOR ACUTE OR CHRONIC TOXICITY STUDIES**

1. Chemical RH-7592 /INDAR Shaughnessy 129011
2. Common Name Of Organism Tested Fathead Minnow
3. Scientific Name Pimephales promelas
4. Age Of Organisms <24 hours
5. Guideline No. 72-4
6. Type Of Dosing Method (Circle One) Or Study
1. Oral 2. Dietary 3. Reproduction 4. Static
5. Static Renewal 6. Flowthrough 7. Acute Contact
8. Other _____
7. % AI Of Test Substance 96.7%
8. Study Duration (Hrs Or Days) 35 days
9. Dose Type (Circle One) A. LD50 B. LC50 C. EC50 D. MATC
10. Toxicity Level A. mg/kg B. ppm C. mg/l D. µg/l E. ng/l
F. µg/bee G. Other
11. 95% C.L.s NA LC₅₀ = NA
12. Curve Slope NA
13. NOEL 0.28 mg a.i./l LOEL = ND
14. Study Date (YEAR) 1991
15. Study Review Date (YEAR) 1992
16. Category (Circle One) CORE SUPPLEMENTAL INVALID
17. MRID or Accession Number 418750-08
18. Laboratory Analytical Bio-Chemistry Laboratories, INC.
19. Reviewer Rosemary Graham Mora
20. For Reproductive Studies (avian or aquatic) Indicate Which Parameter Affected At What Toxicity Level.
- Eggs Laid _____ % Cracked _____ % Viable _____
% Live Embryos _____ % Eggs hatched _____ 14D Survivors _____
Growth Effectuated at _____ Other Effects _____