

MRID No. 423129-01

## DATA EVALUATION RECORD

1. **CHEMICAL:** Diuron. Shaughnessey No. 035505.
2. **TEST MATERIAL:** DPX-14740-166 (Diuron); Urea, N'-(3,4-dichlorophenyl)-N, N-dimethyl-; CAS No. 330-54-1; Lot No. 2507; 96.8% active ingredient; a yellow powder.
3. **STUDY TYPE:** Marine Fish Early Life-Stage Toxicity Test. Species Tested: Sheepshead Minnow (*Cyprinodon variegatus*).
4. **CITATION:** Ward, T.J. and R.L. Boeri. 1992. Early Life Stage Toxicity of DPX-14740-166 (Diuron) to the Sheepshead Minnow, *Cyprinodon variegatus*. EnviroSystems Study No. 91136-DU. Study performed by EnviroSystems Division, Resource Analysts, Inc., Hampton, NH. Submitted by E.I. du Pont de Nemours and Company, Inc., Newark, DE. EPA MRID No. 423129-01.
5. **REVIEWED BY:**  
 Rosemary Graham Mora, M.S.  
 Associate Scientist  
 KBN Engineering and Applied Sciences, Inc.  
 Signature: *Rosemary Graham Mora*  
 Date: 5 Aug 1992  
 Richard W. Pothauer  
 Signature: *P. Kosalwat*  
 Date: 8/5/92  
 Henry T. Craven  
 Signature: *Henry T. Craven*  
 Date: 9/22/93
6. **APPROVED BY:**  
 Pim Kosalwat, PhD.  
 Senior Scientist  
 KBN Engineering and Applied Sciences, Inc.  
 Signature: *P. Kosalwat*  
 Date: 8/5/92  
 Henry T. Craven, M.S.  
 Supervisor, EEB/EFED  
 USEPA  
 Signature: *Henry T. Craven*  
 Date: 9/22/93
7. **CONCLUSIONS:** This study is scientifically sound but does not fulfill the guideline requirements for an early life stage toxicity study. By test termination, weight or survival was significantly reduced in sheepshead minnow exposed to all concentrations of DPX-14740-166, therefore, no MATC could be determined from this study. Based on mean measured concentrations, the LOEC was 0.44 mg a.i./l, the lowest concentration tested. *suppl*  
*NO NOEC established*
8. **RECOMMENDATIONS:** N/A.
9. **BACKGROUND:**



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

- A. **Test Animals:** Sheepshead minnows (*Cyprinodon variegatus*) were obtained from a commercial supplier as less than 24 hour old embryos. The embryos were not treated for any disease and were free of apparent sickness.
- B. **Test System:** The test system consisted of an intermittent-flow proportional diluter, a temperature-controlled water bath, nitex/glass cages (embryo stage) and 23-l glass aquaria (larval stage). The total solution volume in the tanks was 15 l and the solution depth was 17.5 cm. The system was activated 5,557 times during the test resulting in an average of 4.9 volume exchanges every 24 hours.

The test temperature was maintained at  $30 \pm 1^\circ\text{C}$ . The photoperiod was 16 hours of light (light intensity of  $10 \mu\text{Es}^{-1}\text{m}^{-2}$ ) and 8 hours of darkness with 15-minute dawn/dusk simulation periods. The test vessels were aerated after 2 days to maintain acceptable levels of dissolved oxygen.

The dilution water was seawater collected from the Atlantic Ocean at EnviroSystems, Hampton, NH. The dilution water was stored and aerated in polyethylene tanks. The salinity was adjusted to  $20 \pm 1$  parts per thousand (ppt) and the pH was 7.5.

A primary stock solution (60,000 mg/l) was prepared by combining 30.9 g of test material with dimethylformamide (DMF) to a volume of 500 ml or by combining 61.8 g of test material with DMF to a volume of 1,000 ml.

- C. **Dosage:** Thirty-eight-day flow-through test. Five nominal concentrations (0.48, 0.90, 1.5, 3.0, and 6.0 mg a.i./l) were chosen for the study. In addition, a dilution water control and a solvent control were used.
- D. **Design:** Eighty embryos (<24 hours old) were indiscriminately and equally distributed into two replicate aquaria of each treatment. Two cages, each containing 20 embryos, were suspended and oscillated (2 cycles/minute) in each aquarium. The aquaria were randomly positioned in the water bath. Hatching was complete on day 6 at which time fish were reduced to 20

per replicate and released into test vessels. At any time during the study, the maximum organism loading rate was 0.3 g/l. Fish were fed *Artemia salina* nauplii at least twice daily, except during the 24 hours prior to test termination.

Mortality, biological observations, and observations of physical characteristics were recorded at test initiation and every 24 hours thereafter. Dead fish were removed when observed. Total length and wet weight (blotted dry) of each fish were measured at test termination. The dissolved oxygen, pH, salinity, and temperature were measured daily in each replicate which contained live organisms. The temperature in one test vessel was also measured continuously throughout the test period.

Chemical analysis of filtered composite samples (collected on days 0, 7, 14, 21, 28, 35, and 38) was performed to verify the actual exposure concentration of test material using high performance liquid chromatography.

- E. **Statistics:** Shapiro-Wilk's test was used to determine if data were normally distributed. A parametric one-way analysis of variance (ANOVA) coupled with Bonferroni's test was used to compare treatment means to the pooled control means.

The no-observed-effect level (NOEL) and lowest-observed-effect level (LOEL) were determined for the study. The geometric mean maximum acceptable toxicant concentration (MATC) was calculated as the geometric mean of the NOEL and LOEL.

12. **REPORTED RESULTS:** Mean measured concentrations were 0.44, 1.0, 1.7, 3.6, and 7.1 mg a.i./l (Table A.1, attached). No insoluble test material was observed in any test chamber during the study.

By day 6, hatchability in the control and solvent control was 75 and 78%, respectively (Table 3, attached). Survival at test termination was 98% in both controls. Mean fish weight and length data are presented in Table 4 (attached). A summary of all test results is presented in Table 6 (attached).

Survival was affected at the two highest test concentrations (3.6 and 7.1 mg a.i./l). Sublethal effects were observed at 7.1 mg a.i./l (days 7-8) and 3.6 mg a.i./l (days 13-38). No

other toxicant-related effects were demonstrated. Therefore, the LOEC was 3.6 mg a.i./l and the NOEC was 1.7 mg a.i./l. The geometric mean MATC was 2.5 mg a.i./l.

The salinity ranged from 19 to 20 ppt. The temperature ranged from 29 to 31°C. The dissolved oxygen concentration was  $\geq 5.7$  mg/l. The pH range was 7.4-8.3.

13. **STUDY AUTHORS' CONCLUSIONS/QUALITY ASSURANCE MEASURES:**  
The authors made no conclusions in the report.

Good Laboratory Practice and Quality Assurance Statements were included in the report, indicating that the study was conducted in accordance with GLP regulations (40 CFR 160).

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

A. **Test Procedure:** The test procedures were generally in accordance with the SEP and Subdivision E, except for the following deviations:

The test organism were indiscriminately distributed to the test chambers; random assignment to the test vessels is required.

The SEP recommends a minimum of 20 embryos per replicate with four replicates per concentration be used for the embryo stage of the test. There were only two true replicates per concentration used during this study.

The concentration of solvent in the solvent control was not reported; the SEP recommends a solvent concentration of  $\leq 0.1$  ml/l.

During the test period, the pH of the dilution water control ranged from 7.5 to 8.3. The SEP recommends the use of seawater with constant quality. The quality is considered to be constant "if monthly pH range is less than 0.8 of a pH unit."

The diluter system should operate for at least two days prior to test initiation; the pretest operation period was not reported.

The means for weight data presented in Table 4 (attached) are different from those presented in the statistical analysis in the raw data section of the report (raw data, attached). In addition, some of the means for length and weight (Table 4 and raw data,

attached) obtained by the author differ from those obtained by the reviewer. These are discrepancies in the report.

- B. **Statistical Analysis:** The reviewer used the computer program Toxstat Version 3.1 to analyze transformed (arcsine square-root) percentage hatched and survival data (printouts, attached). Hatchability and survival data met the assumptions of normality (Chi-square or Shapiro Wilk's test), but did not meet the assumptions of homogeneity of variance (Bartlett's or Hartley test). The data were analyzed using William's test. Hatchability was not significantly reduced at any test level when compared to the solvent control. A significant reduction in larval survival was detected at the two highest test concentrations when compared to the solvent control. These conclusions agree with those of the authors.

Statistical analysis of length and weight data was performed using a two-way ANOVA coupled with multiple comparison tests (printouts, attached). The significance level was  $p \leq 0.05$ . Only data from the three lowest test concentrations were used, since no length or weight data existed for the highest test concentration (7.1 mg a.i./l; total mortality by day 9) and only three fish survived in one replicate at 3.6 mg a.i./l. The reviewer's analysis showed a significant reduction in weight at 0.44, 1.0, and 1.7 mg a.i./l and an increase in length. These results differ from those presented by the author and may be explained by the following:

The growth data were individually measured; however, the data from these two parameters were statistically analyzed by the authors using a one-way ANOVA and treatment mean values. When treatment mean values were analyzed, the variation that existed within each replicate was ignored. An experimental design which consists of only two replicates such as this one, using only treatment mean values may lead to the wrong conclusion. Individual measurements (i.e., raw data) of these two growth parameters should have been used.

- C. **Discussion/Results:** According to the reviewer's analysis, weight or survival was significantly reduced at all test levels when compared to the solvent control. According to the guidelines, at least one concentration must not affect any life stage. Therefore, this study is scientifically sound but does

not meet the guideline requirements for an early life-stage toxicity study. The MATC of the sheepshead minnows exposed to DPX-14740-166 could not be determined in this study. The LOEC was 0.44 mg a.i./l, the lowest concentration tested.

**D. Adequacy of the Study:**

- (1) **Classification:** Supplemental.
- (2) **Rationale:** No NOEC could be determined in this study.
- (3) **Repairability:** No.

**15. COMPLETION OF ONE-LINER:** Yes, July 31, 1992.

Table A.1 Analytical data from toxicity test with sheepshead minnows (*Cyprinodon variegatus*) and DPX-14740-166.

Sample Description	Nominal Concentration of Active Ingredient (mg/L)	Measured Concentration of Active Ingredient (mg/L)							Mean	
		Day of Exposure								
		0	7	14	21	28	35	38		
Test media										
	0.0 (control)	ND	ND	ND	ND	ND	ND	ND	ND	
	0.0 (solvent control)	ND	ND	ND	ND	ND	ND	ND	ND	
	0.48	0.44	0.39	0.42	0.43	0.45	0.48	0.48	0.44	
	0.90	1.0	0.94	1.0	1.0	1.0	1.2	1.2	1.0	
	1.5	1.7	1.5	1.7	1.7	1.7	1.8	1.9	1.7	
	3.0	3.4	3.2	3.5	3.5	3.6	3.9	4.0	3.6	
	6.0	7.4	6.8	7.2	--	--	--	--	7.1	
	Diluter stock solution (6.0)	6.8	6.9	6.9	7.7	7.4	8.2	7.9		

- Notes: 1. ND = none detected at the analytical detection limit of 0.12 mg/L DPX-14740-166.  
 2. Diuron is the active ingredient component of DPX-14740-166.  
 3. Dashes indicate that no sample was analyzed due to complete mortality of test organisms.

Table 3. Survival of sheepshead minnows (*Cyprinodon variegatus*) at hatch (day 6), and at 11, 18, 25, and 32 days post hatch, after exposure to several concentrations of DPX-14740-166.

Mean Mean Measured Concentration (mg/L)	Rep.	Percent Survival		Percent Survival			
		at Hatch		(days post hatch)			
		day 6	11	18	25	32	
ND (control)	1	75.0	100.0	100.0	100.0	100.0	
	2	75.0	100.0	100.0	95.0	95.0	
	Mean	75.0	100.0	100.0	97.5	97.5	
ND (solvent control)	1	72.5	100.0	100.0	100.0	100.0	
	2	82.5	95.0	95.0	95.0	95.0	
	Mean	77.5	97.5	97.5	97.5	97.5	
0.44	1	75.0	100.0	100.0	100.0	100.0	
	2	87.5	95.0	95.0	95.0	95.0	
	Mean	81.2	97.5	97.5	97.5	97.5	
1.0	1	72.5	100.0	100.0	100.0	100.0	
	2	85.0	100.0	100.0	100.0	100.0	
	Mean	78.8	100.0	100.0	100.0	100.0	
1.7	1	80.0	100.0	100.0	100.0	100.0	
	2	82.5	100.0	100.0	100.0	100.0	
	Mean	81.2	100.0	100.0	100.0	100.0	
3.6	1	72.5	50.0	35.0	5.0	0.0	
	2	80.0	55.0	45.0	20.0	15.0	
	Mean	76.2	52.5*	40.0*	12.5*	7.5*	
7.1	1	67.5	0.0	0.0	0.0	0.0	
	2	77.5	0.0	0.0	0.0	0.0	
	Mean	72.5	0.0#	0.0#	0.0#	0.0#	

- Notes: 1. Concentrations marked with a \* are significantly different than the control at the 95% confidence level.
2. Concentrations marked with a # are assumed to be significantly different than the control because of complete mortality



Table 4. Length and weight of sheepshead minnows (*Cyprinodon variegatus*) at 32 days post hatch after exposure to several concentrations of DPX-14740-166.

Mean Measured Concentration (mg/L)	Rep.	Total Length (mm)	Weight (mg)
		mean ± std. dev.	mean ± std. dev.
ND (control)	1	21.0 ± 1.0	174.6 ± 21.1
	2	23.1 ± 0.9	189.4 ± 22.0 ✓
	Mean	22.0 ± 1.4	182.0 ± 21.6
ND (solvent control)	1	22.6 ± 0.9	217.0 ± 24.0
	2	23.4 ± 1.3	240.0 ± 42.3 ✓
	Mean	23.0 ± 1.2	228.3 ± 33.2
0.44	1	22.4 ± 1.1 ✓	191.2 ± 18.3 ✓
	2	24.8 ± 0.8 ✓	216.0 ± 21.0 ✓
	Mean	23.5 ± 1.5	203.6 ± 19.6
1.0	1	23.6 ± 1.2	218.4 ± 38.2
	2	24.4 ± 1.0	197.4 ± 25.3
	Mean	24.0 ± 1.1	207.9 ± 31.8
1.7	1	23.3 ± 1.1	200.2 ± 18.1
	2	23.8 ± 1.5	186.1 ± 28.1
	Mean	23.5 ± 1.3	188.7 ± 23.1
3.6	1	7.7 ± 0.4	10.4 ± 4.2
	2	--- ± ---	--- ± ---
	Mean	--- ± ---	--- ± ---
7.1	1	--- ± ---	--- ± ---
	2	--- ± ---	--- ± ---
	Mean	--- ± ---	--- ± ---

Red check indicates value is different from reviewer's results.

RGM  
193.2 ± 24.7

Note: Concentrations marked with a \* are significantly different than the control at the 95% confidence level (the 3.6 and 7.1 mg/L concentrations were not included in the statistical analyses because survival at these concentrations was demonstrated to be different than the control).

91136-DU

WEIGHT AT 12.7 TEMPERATURE

TW 11-19-91

91136-du-7  
File: weight

Transform: NO TRANSFORM

t-test of Solvent and Blank Controls

Ho:GRP1 MEAN = GRP2 MEAN

GRP1 (SOLVENT CRTL) MEAN = 179.3500      CALCULATED t VALUE = -3.9502  
 GRP2 (BLANK CRTL) MEAN = 228.5000      DEGREES OF FREEDOM = 2  
 DIFFERENCE IN MEANS = -49.1500

TABLE t VALUE (0.05 (2), 2) = 4.303      NO significant difference at alpha=0.05  
 TABLE t VALUE (0.01 (2), 2) = 9.925      NO significant difference at alpha=0.01

91136-du-7  
File: weight

Transform: NO TRANSFORMATION

Shapiro Wilks test for normality

D = 3633.497

W = 0.968

Critical W (P = 0.05) (n = 10) = 0.842  
 Critical W (P = 0.01) (n = 10) = 0.781

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

TITLE: 91136-du-7  
 FILE: weight  
 TRANSFORM: NO TRANSFORMATION

NUMBER OF GROUPS: 4

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	GRPS 1&2 POOLED	1	174.6000	174.6000
1	GRPS 1&2 POOLED	2	184.1000	184.1000
1	GRPS 1&2 POOLED	3	217.0000	217.0000
1	GRPS 1&2 POOLED	4	240.0000	240.0000
2	0.44	1	181.7000	181.7000 ✓
2	0.44	2	216.0000	216.0000 ✓
3	1.0	1	218.4000	218.4000
3	1.0	2	197.4000	197.4000
4	1.7	1	200.2000	200.2000
4	1.7	2	186.1000	186.1000

Table 4 shows 189.4

Table 4 shows 191.2

✓ indicates value is different from reviewer's results.

91136-du-7  
File: weight

Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

Table 6. No observed effect levels (NOEL), lowest observed effect levels (LOEL), and maximum acceptable toxicant concentrations (MATC) from toxicity test with sheepshead minnows (*Cyprinodon variegatus*) and DPX-14740-166.

Biological Endpoint	NOEL	LOEL	MATC
Number of Embryos Hatched	7.1 mg/L	>7.1 mg/L	>7.1 mg/L
Time to Hatch	7.1 mg/L	>7.1 mg/L	>7.1 mg/L
Mortality of Embryos (Day 6)	7.1 mg/L	>7.1 mg/L	>7.1 mg/L
Mortality of Larvae and Juveniles (Days 11-32)	1.7 mg/L	3.6 mg/L	2.5 mg/L
Mean Total Length	1.7 mg/L	3.6 mg/L	2.5 mg/L
Mean Wet Weight	1.7 mg/L	3.6 mg/L	2.5 mg/L
Sublethal Effects	1.7 mg/L	3.6 mg/L	2.5 mg/L

Study/Species/Lab/ MRID # \_\_\_\_\_ Chemical % a.i. \_\_\_\_\_ Results \_\_\_\_\_ Reviewer/ Validation Date \_\_\_\_\_ Status \_\_\_\_\_

Chronic Fish 918 i. Concentrations Tested (ppm) - 0.44, 1.0, 1.7, 3.6, 7.1

Species: MATC - > ND < 0.44 ppm. CGM 3/31/92 Supplemental

Lab: Cyprinodon variegatus Effected Parameters - \* weight (reduced), length (measured), survival

MRID # 423129-01 EnviroSystems Division, Resource Analysts Control Mortality (%) - 97.5 Solvent Control Mortality (%) - 97.5

Comments: \* mean measured concentrations  
\* Treatments compared to solvent control

Chronic Invertebrate Concentrations Tested (ppm) - \_\_\_\_\_

Species: MATC - > \_\_\_\_\_ < \_\_\_\_\_ ppm. \_\_\_\_\_

Lab: Effected Parameters - \_\_\_\_\_

MRID # \_\_\_\_\_ Control Mortality (%) - \_\_\_\_\_ Solvent Control Mortality (%) - \_\_\_\_\_  
Comments: \_\_\_\_\_

DIURON: Hatchability of Exposed P.p. Embryos

File: 42312901.hat

Transform: ARC SINE(SQUARE ROOT(Y))

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	0.938	3.388	5.348	3.388	0.938
OBSERVED	0	6	2	6	0

---

Calculated Chi-Square goodness of fit test statistic = 7.9994

Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

DIURON: Hatchability of Exposed P.p. Embryos

File: 42312901.hat Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro Wilks test for normality

---

D = 0.043

W = 0.938

Critical W (P = 0.05) (n = 14) = 0.874

Critical W (P = 0.01) (n = 14) = 0.825

---

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

DIURON: Hatchability of Exposed P.p. Embryos  
File: 42312901.hat Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance  
Bartlett's test for homogeneity of variance

---

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.  
Additional transformations are useless.

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TITLE: DIURON: Hatchability of Exposed P.p. Embryos

FILE: 42312901.hat

TRANSFORM: ARC SINE(SQUARE ROOT(Y))

NUMBER OF GROUPS: 7

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GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	SOLVENT CONTROL	1	0.7300	1.0244
1	SOLVENT CONTROL	2	0.8300	1.1458
2	CONTROL	1	0.7500	1.0472
2	CONTROL	2	0.7500	1.0472
3	0.44 mg ai/l	1	0.7500	1.0472
3	0.44 mg ai/l	2	0.8800	1.2171
4	1.0 mg ai/l	1	0.7300	1.0244
4	1.0 mg ai/l	2	0.8500	1.1731
5	1.7 mg ai/l	1	0.8000	1.1071
5	1.7 mg ai/l	2	0.8300	1.1458
6	3.6 mg ai/l	1	0.7300	1.0244
6	3.6 mg ai/l	2	0.8000	1.1071
7	7.1 mg ai/l	1	0.6800	0.9695
7	7.1 mg ai/l	2	0.7800	1.0826

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DIURON: Hatchability of Exposed P.p. Embryos  
 File: 42312901.hat 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 CONTROL	2	0.780	1.085	1.098
2	CONTROL	2	0.750	1.047	1.098
3	0.44 mg ai/l	2	0.815	1.132	1.098
4	1.0 mg ai/l	2	0.790	1.099	1.098
5	1.7 mg ai/l	2	0.815	1.126	1.098
6	3.6 mg ai/l	2	0.765	1.066	1.066
7	7.1 mg ai/l	2	0.730	1.026	1.026

DIURON: Hatchability of Exposed P.p. Embryos  
 File: 42312901.hat 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 CONTROL	1.098				
CONTROL	1.098	0.163		1.89	k= 1, v= 7
0.44 mg ai/l	1.098	0.163		2.00	k= 2, v= 7
1.0 mg ai/l	1.098	0.163		2.04	k= 3, v= 7
1.7 mg ai/l	1.098	0.163		2.06	k= 4, v= 7
3.6 mg ai/l	1.066	0.245		2.07	k= 5, v= 7
7.1 mg ai/l	1.026	0.750		2.08	k= 6, v= 7

s = 0.079

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

DIURON: Survival of Exposed P.p. Embryos

File: 42312901.sur

Transform: ARC SINE(SQUARE ROOT(Y))

Chi-square test for normality: actual and expected frequencies

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INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	0.938	3.388	5.348	3.388	0.938
OBSERVED	0	4	6	4	0

---

Calculated Chi-Square goodness of fit test statistic = 2.1766

Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

DIURON: Survival of Exposed P.p. Embryos

File: 42312901.sur Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro Wilks test for normality

---

D = 0.060

W = 0.927

Critical W (P = 0.05) (n = 14) = 0.874

Critical W (P = 0.01) (n = 14) = 0.825

---

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

DIURON: Survival of Exposed P.p. Embryos  
File: 42312901.sur      Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance  
Bartlett's test for homogeneity of variance

---

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.  
Additional transformations are useless.

---

TITLE: DIURON: Survival of Exposed P.p. Embryos

FILE: 42312901.sur

TRANSFORM: ARC SINE(SQUARE ROOT(Y))

NUMBER OF GROUPS: 7

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GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	SOLVENT CONTROL	1	1.0000	1.4588
1	SOLVENT CONTROL	2	0.9500	1.3453
2	CONTROL	1	1.0000	1.4588
2	CONTROL	2	0.9500	1.3453
3	0.44 mg ai/l	1	1.0000	1.4588
3	0.44 mg ai/l	2	0.9500	1.3453
4	1.0 mg ai/l	1	1.0000	1.4588
4	1.0 mg ai/l	2	1.0000	1.4588
5	1.7 mg ai/l	1	1.0000	1.4588
5	1.7 mg ai/l	2	1.0000	1.4588
6	3.6 mg ai/l	1	0.0000	0.1120
6	3.6 mg ai/l	2	0.1500	0.3977
7	7.1 mg ai/l	1	0.0000	0.1120
7	7.1 mg ai/l	2	0.0000	0.1120

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DIURON: Survival of Exposed P.p. Embryos

File: 42312901.sur

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 CONTROL	2	0.975	1.402	1.425
2	CONTROL	2	0.975	1.402	1.425
3	0.44 mg ai/l	2	0.975	1.402	1.425
4	1.0 mg ai/l	2	1.000	1.459	1.425
5	1.7 mg ai/l	2	1.000	1.459	1.425
6	3.6 mg ai/l	2	0.075	0.255	0.255
7	7.1 mg ai/l	2	0.000	0.112	0.112

DIURON: Survival of Exposed P.p. Embryos

File: 42312901.sur

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 CONTROL	1.425				
CONTROL	1.425	0.245		1.89	k= 1, v= 7
0.44 mg ai/l	1.425	0.245		2.00	k= 2, v= 7
1.0 mg ai/l	1.425	0.245		2.04	k= 3, v= 7
1.7 mg ai/l	1.425	0.245		2.06	k= 4, v= 7
3.6 mg ai/l	0.255	12.377	*	2.07	k= 5, v= 7
7.1 mg ai/l	0.112	13.918	*	2.08	k= 6, v= 7

s = 0.093

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

# Analysis using Crunch<sup>®</sup>

Analysis of Variance

File: diuron

Date: 08-05-1992

FILTER: None

N's, means and standard deviations based on dependent variable: LENGTH

\* Indicates statistics are collapsed over this factor

Factors: T R	N	Mean	S.D.
* *	197	23.2279	1.5066
1 * <i>Control</i>	39	22.0385	1.4583
2 * <i>Solvent Cont.</i>	39	23.0077	1.2186
3 *	39	23.5462	1.5314
4 *	40	23.9750	1.2116
5 *	40	23.5450	1.3769
* 1	101	22.6020	1.4328
* 2	96	23.8865	1.2913
1 1	20	21.0000	1.0558
1 2	19	23.1316	0.9238
2 1	20	22.6050	0.9367
2 2	19	23.4316	1.3561
3 1	21	22.5286	1.2523
3 2	18	24.7333	0.7911
4 1	20	23.5550	1.2915
4 2	20	24.3950	0.9870
5 1	20	23.3250	1.1318
5 2	20	23.7650	1.5839

Fmax for testing homogeneity of between subjects variances: 4.01

Number of variances= 10 df per variance= 19.

Analysis of Variance Dependent variable: LENGTH

Source	df	SS (H)	MSS	F	P
Between Subjects	196	444.9168			
T (TRT)	4	87.3655	21.8414	16.304	0.0000
R (REP)	1	80.6846	80.6846	60.228	0.0000
TR	4	26.3498	6.5874	4.917	0.0009
Subj w Groups	187	250.5170	1.3397		

Post-hoc tests for factor T (TRT)

Level	Mean
1	22.038
2	23.008
3	23.546
4	23.975
5	23.545

Comparison	Bon-	
	ferroni	T-test
1 < 2	0.0030	0.0003
1 < 3	0.0000	0.0000
1 < 4	0.0000	0.0000
1 < 5	0.0000	0.0000
2 < 3		0.0413
2 < 4	0.0028	0.0003
2 < 5		0.0405
3 < 4		
3 > 5		
4 > 5		

Analysis of Variance

File: diuron

Date: 08-05-1992

FILTER: None

N's, means and standard deviations based on dependent variable: WEIGHT

\* Indicates statistics are collapsed over this factor

Factors: T R	N	Mean	S.D.
**	197	0.2024	0.0330
1 * <i>Control</i>	39	0.1792	0.0222
2 * <i>Solvent Cont.</i>	39	0.2283	0.0366
3 *	39	0.2033	0.0235
4 *	40	0.2079	0.0345
5 *	40	0.1932	0.0250
* 1	101	0.2008	0.0304
* 2	96	0.2041	0.0356
1 1	20	0.1746	0.0217
1 2	19	0.1841	0.0222
2 1	20	0.2170	0.0247
2 2	19	0.2402	0.0434
3 1	21	0.1939	0.0219
3 2	18	0.2143	0.0209
4 1	20	0.2184	0.0393
4 2	20	0.1974	0.0260
5 1	20	0.2002	0.0186
5 2	20	0.1861	0.0288

Fmax for testing homogeneity of between subjects variances: 5.45

Number of variances= 10 df per variance= 19.

Analysis of Variance Dependent variable: WEIGHT

Source	df	SS (H)	MSS	F	P
Between Subjects	196	0.2132			
T (TRT)	4	0.0518	0.0129	16.706	0.0000
R (REP)	1	0.0006	0.0006	0.722	0.3964
TR	4	0.0160	0.0040	5.160	0.0006
Subj w Groups	187	0.1449	0.0008		

Post-hoc tests for factor T (TRT)

Level	Mean
1	0.179
2	0.228
3	0.203
4	0.208
5	0.193

Comparison	Bonferroni	T-test
1 < 2	0.0000	0.0000
1 < 3	0.0019	0.0002
1 < 4	0.0000	0.0000
1 < 5		0.0275
2 > 3	0.0011	0.0001
2 > 4	0.0136	0.0014
2 > 5	0.0000	0.0000
3 < 4		
3 > 5		
4 > 5		0.0187



Analysis using <sup>^</sup>hystat<sup>®</sup>,  
 a program developed in

Diuron : Cyprinodon variegatus

ANOVA on Weights

LEVELS ENCOUNTERED DURING PROCESSING ARE:

TRT	-1.000	0.000	1.000	2.000	3.000
REP	1.000	2.000			

DEP VAR: WEIGHT N: 197 MULTIPLE R: 0.574 SQUARED MULTIPLE R: 0.330

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
TRT	0.052	4	0.013	17.058	0.000
REP	0.001	1	0.001	1.295	0.257
TRT*REP	0.018	4	0.004	5.758	0.000
ERROR	0.143	187	0.001		
DURBIN-WATSON D STATISTIC	1.710				
FIRST ORDER AUTOCORRELATION	.145				

Post-hoc contrast of Treatment 1 with solvent control.  
 TEST FOR EFFECT CALLED: TRT

A MATRIX

	1	2	3	4	5
	0.000	0.000	1.000	-1.000	0.000
	6	7	8	9	10
	0.000	0.000	0.000	0.000	0.000

TEST OF HYPOTHESIS

SOURCE	SS	DF	MS	F	P
HYPOTHESIS	0.012	1	0.012	15.900	0.000
ERROR	0.143	187	0.001		

Post-hoc contrast of Treatment 2 with solvent control.  
TEST FOR EFFECT CALLED: TRT

A MATRIX

	1	2	3	4	5
	0.000	0.000	1.000	0.000	-1.000
	6	7	8	9	10
	0.000	0.000	0.000	0.000	0.000

TEST OF HYPOTHESIS

SOURCE	SS	DF	MS	F	P
HYPOTHESIS	0.008	1	0.008	11.056	0.001
ERROR	0.143	187	0.001		

---

Post-hoc contrast of Treatment 3 with solvent control.  
TEST FOR EFFECT CALLED: TRT

A MATRIX

	1	2	3	4	5
	0.000	1.000	2.000	1.000	1.000
	6	7	8	9	10
	0.000	0.000	0.000	0.000	0.000

TEST OF HYPOTHESIS

SOURCE	SS	DF	MS	F	P
HYPOTHESIS	0.025	1	0.025	32.467	0.000
ERROR	0.143	187	0.001		

---

COL/ ROW	TRT	
1		-1.000
2		0.000
3		1.000
4		2.000
5		3.000

USING LEAST SQUARES MEANS.

POST HOC TEST OF WEIGHT

MATRIX OF PAIRWISE MEAN DIFFERENCES:

	1	2	3	4	5
1	0.000				
2	0.049	0.000			
3	0.024	-0.025	0.000		
4	0.029	-0.021	0.004	0.000	
5	0.014	-0.035	-0.010	-0.015	0.000

BONFERRONI ADJUSTMENT.

MATRIX OF PAIRWISE COMPARISON PROBABILITIES:

	1	2	3	4	5
1	1.000				
2	0.000	1.000			
3	0.001	0.001	1.000		
4	0.000	0.011	1.000	1.000	
5	0.279	0.000	0.937	0.179	1.000

Diuron : Cyprinodon variegatus

ANOVA on Lengths

LEVELS ENCOUNTERED DURING PROCESSING ARE:

TRT	-1.000	0.000	1.000	2.000	3.000
REP	1.000	2.000			

---

DEP VAR: LENGTH N: 197 MULTIPLE R: 0.674 SQUARED MULTIPLE R: 0.454

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
TRT	85.397	4	21.349	16.446	0.000
REP	86.060	1	86.060	66.294	0.000
TRT*REP	29.644	4	7.411	5.709	0.000
ERROR	242.756	187	1.298		

DURBIN-WATSON D STATISTIC 1.937  
FIRST ORDER AUTOCORRELATION .026

---

Post-hoc contrast of Treatment 1 with solvent control.  
TEST FOR EFFECT CALLED: TRT

A MATRIX

	1	2	3	4	5
	0.000	0.000	1.000	-1.000	0.000
	6	7	8	9	10
	0.000	0.000	0.000	0.000	0.000

TEST OF HYPOTHESIS

SOURCE	SS	DF	MS	F	P
HYPOTHESIS	6.074	1	6.074	4.679	0.032
ERROR	242.756	187	1.298		

Post-hoc contrast of Treatment 2 with solvent control.  
TEST FOR EFFECT CALLED: TRT

A MATRIX

	1	2	3	4	5
	0.000	0.000	1.000	0.000	-1.000
	6	7	8	9	10
	0.000	0.000	0.000	0.000	0.000

TEST OF HYPOTHESIS

SOURCE	SS	DF	MS	F	P
HYPOTHESIS	18.068	1	18.068	13.918	0.000
ERROR	242.756	187	1.298		

---

Post-hoc contrast of Treatment 3 with solvent control.  
TEST FOR EFFECT CALLED: TRT

A MATRIX

	1	2	3	4	5
	0.000	1.000	2.000	1.000	1.000
	6	7	8	9	10
	0.000	0.000	0.000	0.000	0.000

TEST OF HYPOTHESIS

SOURCE	SS	DF	MS	F	P
HYPOTHESIS	5.476	1	5.476	4.219	0.041
ERROR	242.756	187	1.298		

---

COL/ ROW	TRT	
1	-1.000	
2	0.000	
3	1.000	
4	2.000	
5	3.000	

USING LEAST SQUARES MEANS.

POST HOC TEST OF LENGTH

MATRIX OF PAIRWISE MEAN DIFFERENCES:

	1	2	3	4	5
1	0.000				
2	0.953	0.000			
3	1.511	0.558	0.000		
4	1.909	0.957	0.398	0.000	
5	1.479	0.527	-0.032	-0.430	0.000

BONFERRONI ADJUSTMENT.

MATRIX OF PAIRWISE COMPARISON PROBABILITIES:

	1	2	3	4	5
1	1.000				
2	0.003	1.000			
3	0.000	0.318	1.000		
4	0.000	0.003	1.000	1.000	
5	0.000	0.414	1.000	0.931	1.000

Diuron : *Cyprinodon variegatus*

Dilution Water Control

THE FOLLOWING RESULTS ARE FOR:

REP = 1.000

TOTAL OBSERVATIONS: 20

	REP	WEIGHT	LENGTH
N OF CASES	20	20	20
MINIMUM	1.000	0.142	19.000
MAXIMUM	1.000	0.210	23.000
RANGE	0.000	0.068	4.000
MEAN	1.000	0.175	21.000
STANDARD DEV	0.000	0.022	1.056
C.V.	0.000	0.124	0.050

THE FOLLOWING RESULTS ARE FOR:

REP = 2.000

TOTAL OBSERVATIONS: 19

	REP	WEIGHT	LENGTH
N OF CASES	19	19	19
MINIMUM	2.000	0.134	21.600
MAXIMUM	2.000	0.215	25.000
RANGE	0.000	0.080	3.400
MEAN	2.000	0.184	23.132
STANDARD DEV	0.000	0.022	0.924
C.V.	0.000	0.121	0.040

Diuron : *Cyprinodon variegatus*

Solvent Control

THE FOLLOWING RESULTS ARE FOR:

REP = 1.000

TOTAL OBSERVATIONS: 20

	REP	WEIGHT	LENGTH
N OF CASES	20	20	20
MINIMUM	1.000	0.158	21.300
MAXIMUM	1.000	0.261	24.600
RANGE	0.000	0.103	3.300
MEAN	1.000	0.217	22.605
STANDARD DEV	0.000	0.025	0.937
C.V.	0.000	0.114	0.041

THE FOLLOWING RESULTS ARE FOR:

REP = 2.000

TOTAL OBSERVATIONS: 19

	REP	WEIGHT	LENGTH
N OF CASES	19	19	19
MINIMUM	2.000	0.111	19.200
MAXIMUM	2.000	0.309	24.900
RANGE	0.000	0.198	5.700
MEAN	2.000	0.240	23.432
STANDARD DEV	0.000	0.043	1.356
C.V.	0.000	0.181	0.058



KOLMOGOROV-SMIRNOV ONE SAMPLE TEST USING STANDARD NORMAL DISTRIBUTION

VARIABLE	N-OF-CASES	MAXDIF	PROBABILITY (2-TAIL)
REP	197.000	0.841	0.000
LENGTH	197.000	1.000	0.000
WEIGHT	197.000	0.543	0.000

RAW DATA

DIURON : Cyprinodon variegatus

TRT -1 = DILUTION WATER CONTROL

TRT 0 = SOLVENT CONTROL

TRT 1 = 0.44 mg a.i./l

TRT 2 = 1.0 mg a.i./l

TRT 3 = 1.7 mg a.i./l

		TRT	REP	LENGTH	WEIGHT
CASE	1	-1.0000	1.0000	21.2000	0.1718
CASE	2	-1.0000	1.0000	20.1000	0.1577
CASE	3	-1.0000	1.0000	20.1000	0.1529
CASE	4	-1.0000	1.0000	21.0000	0.1823
CASE	5	-1.0000	1.0000	21.7000	0.1833
CASE	6	-1.0000	1.0000	22.1000	0.2041
CASE	7	-1.0000	1.0000	22.1000	0.2038
CASE	8	-1.0000	1.0000	21.0000	0.1661
CASE	9	-1.0000	1.0000	21.0000	0.1607
CASE	10	-1.0000	1.0000	21.0000	0.1443
CASE	11	-1.0000	1.0000	22.0000	0.2015
CASE	12	-1.0000	1.0000	22.4000	0.1792
CASE	13	-1.0000	1.0000	19.8000	0.1416
CASE	14	-1.0000	1.0000	19.5000	0.1533
CASE	15	-1.0000	1.0000	19.9000	0.1595
CASE	16	-1.0000	1.0000	20.9000	0.1892
CASE	17	-1.0000	1.0000	20.5000	0.1635
CASE	18	-1.0000	1.0000	19.0000	0.1634
CASE	19	-1.0000	1.0000	23.0000	0.2044
CASE	20	-1.0000	1.0000	21.7000	0.2098
CASE	21	-1.0000	2.0000	23.6000	0.1916
CASE	22	-1.0000	2.0000	23.0000	0.1704
CASE	23	-1.0000	2.0000	25.0000	0.1386
CASE	24	-1.0000	2.0000	22.6000	0.1796
CASE	25	-1.0000	2.0000	22.7000	0.1890
CASE	26	-1.0000	2.0000	22.6000	0.1724
CASE	27	-1.0000	2.0000	23.2000	0.2034
CASE	28	-1.0000	2.0000	21.6000	0.1343
CASE	29	-1.0000	2.0000	24.4000	0.2095
CASE	30	-1.0000	2.0000	21.8000	0.1724
CASE	31	-1.0000	2.0000	24.6000	0.2145
CASE	32	-1.0000	2.0000	22.1000	0.1706
CASE	33	-1.0000	2.0000	23.3000	0.1965
CASE	34	-1.0000	2.0000	22.4000	0.1889
CASE	35	-1.0000	2.0000	23.3000	0.2051
CASE	36	-1.0000	2.0000	23.9000	0.2121
CASE	37	-1.0000	2.0000	22.6000	0.1742
CASE	38	-1.0000	2.0000	23.8000	0.1958
CASE	39	-1.0000	2.0000	23.0000	0.1791
CASE	40	0.0000	1.0000	23.0000	0.2569
CASE	41	0.0000	1.0000	22.1000	0.2227
CASE	42	0.0000	1.0000	23.4000	0.2415
CASE	43	0.0000	1.0000	21.6000	0.2042
CASE	44	0.0000	1.0000	22.9000	0.2179
CASE	45	0.0000	1.0000	24.1000	0.2341

CASE	46	0.0000	1.0000	23.6000	0.2228
CASE	47	0.0000	1.0000	22.4000	0.2280
CASE	48	0.0000	1.0000	23.2000	0.2062
CASE	49	0.0000	1.0000	21.5000	0.1840
CASE	50	0.0000	1.0000	22.9000	0.2198
CASE	51	0.0000	1.0000	22.5000	0.1881
CASE	52	0.0000	1.0000	24.6000	0.2609
CASE	53	0.0000	1.0000	23.0000	0.2103
CASE	54	0.0000	1.0000	21.8000	0.2077
CASE	55	0.0000	1.0000	23.0000	0.2398
CASE	56	0.0000	1.0000	21.3000	0.2196
CASE	57	0.0000	1.0000	22.4000	0.2243
CASE	58	0.0000	1.0000	21.4000	0.1933
CASE	59	0.0000	1.0000	21.4000	0.1579
CASE	60	0.0000	2.0000	24.9000	0.2661
CASE	61	0.0000	2.0000	24.3000	0.3090
CASE	62	0.0000	2.0000	24.6000	0.2631
CASE	63	0.0000	2.0000	23.7000	0.2387
CASE	64	0.0000	2.0000	19.2000	0.1110
CASE	65	0.0000	2.0000	23.4000	0.2351
CASE	66	0.0000	2.0000	24.4000	0.2882
CASE	67	0.0000	2.0000	23.1000	0.2279
CASE	68	0.0000	2.0000	22.9000	0.2454
CASE	69	0.0000	2.0000	24.3000	0.2495
CASE	70	0.0000	2.0000	24.9000	0.2823
CASE	71	0.0000	2.0000	23.1000	0.2322
CASE	72	0.0000	2.0000	23.2000	0.2568
CASE	73	0.0000	2.0000	23.4000	0.2485
CASE	74	0.0000	2.0000	23.7000	0.2496
CASE	75	0.0000	2.0000	23.5000	0.2324
CASE	76	0.0000	2.0000	24.1000	0.2407
CASE	77	0.0000	2.0000	21.0000	0.1613
CASE	78	0.0000	2.0000	23.5000	0.2263
CASE	79	1.0000	1.0000	21.5000	0.1681
CASE	80	1.0000	1.0000	22.4000	0.1729
CASE	81	1.0000	1.0000	21.9000	0.1748
CASE	82	1.0000	1.0000	22.2000	0.1863
CASE	83	1.0000	1.0000	21.7000	0.1892
CASE	84	1.0000	1.0000	20.5000	0.1749
CASE	85	1.0000	1.0000	24.8000	0.2172
CASE	86	1.0000	1.0000	21.5000	0.1956
CASE	87	1.0000	1.0000	22.9000	0.2122
CASE	88	1.0000	1.0000	22.8000	0.1934
CASE	89	1.0000	1.0000	22.7000	0.2035
CASE	90	1.0000	1.0000	23.8000	0.2200
CASE	91	1.0000	1.0000	23.6000	0.2031
CASE	92	1.0000	1.0000	21.8000	0.1925
CASE	93	1.0000	1.0000	22.7000	0.1731
CASE	94	1.0000	1.0000	20.9000	0.1680
CASE	95	1.0000	1.0000	21.6000	0.1683
CASE	96	1.0000	1.0000	21.6000	0.1938
CASE	97	1.0000	1.0000	22.6000	0.1872
CASE	98	1.0000	1.0000	24.3000	0.2308
CASE	99	1.0000	2.0000	25.3000	0.2469
CASE	100	1.0000	2.0000	24.0000	0.1977
CASE	101	1.0000	2.0000	24.9000	0.2325
CASE	102	1.0000	2.0000	24.4000	0.1914
CASE	103	1.0000	2.0000	23.9000	0.1883
CASE	104	1.0000	2.0000	25.7000	0.2421
CASE	105	1.0000	2.0000	26.4000	0.2561

CASE	106	1.0000	2.0000	23.9000	0.2079
CASE	107	1.0000	2.0000	23.8000	0.1941
CASE	108	1.0000	2.0000	25.7000	0.2386
CASE	109	1.0000	2.0000	23.7000	0.1958
CASE	110	1.0000	2.0000	25.3000	0.2038
CASE	111	1.0000	2.0000	24.2000	0.2042
CASE	112	1.0000	2.0000	25.8000	0.2259
CASE	113	1.0000	2.0000	24.4000	0.1930
CASE	114	1.0000	2.0000	25.0000	0.2276
CASE	115	1.0000	2.0000	24.8000	0.2361
CASE	116	1.0000	2.0000	24.5000	0.2218
CASE	117	1.0000	2.0000	24.8000	0.2007
CASE	118	2.0000	1.0000	24.5000	0.2620
CASE	119	2.0000	1.0000	23.8000	0.2710
CASE	120	2.0000	1.0000	25.4000	0.2346
CASE	121	2.0000	1.0000	24.4000	0.2669
CASE	122	2.0000	1.0000	22.2000	0.1730
CASE	123	2.0000	1.0000	23.5000	0.2071
CASE	124	2.0000	1.0000	23.6000	0.2225
CASE	125	2.0000	1.0000	23.9000	0.2255
CASE	126	2.0000	1.0000	21.0000	0.2118
CASE	127	2.0000	1.0000	24.2000	0.2608
CASE	128	2.0000	1.0000	24.4000	0.2315
CASE	129	2.0000	1.0000	22.6000	0.2246
CASE	130	2.0000	1.0000	23.0000	0.1980
CASE	131	2.0000	1.0000	25.3000	0.2433
CASE	132	2.0000	1.0000	25.5000	0.2376
CASE	133	2.0000	1.0000	22.1000	0.2136
CASE	134	2.0000	1.0000	24.5000	0.2047
CASE	135	2.0000	1.0000	23.2000	0.1616
CASE	136	2.0000	1.0000	21.3000	0.1052
CASE	137	2.0000	1.0000	22.7000	0.2127
CASE	138	2.0000	2.0000	23.9000	0.2050
CASE	139	2.0000	2.0000	24.3000	0.1820
CASE	140	2.0000	2.0000	25.0000	0.2225
CASE	141	2.0000	2.0000	26.0000	0.2128
CASE	142	2.0000	2.0000	23.5000	0.2065
CASE	143	2.0000	2.0000	24.5000	0.1868
CASE	144	2.0000	2.0000	25.4000	0.2510
CASE	145	2.0000	2.0000	25.4000	0.2210
CASE	146	2.0000	2.0000	23.7000	0.1910
CASE	147	2.0000	2.0000	24.2000	0.2133
CASE	148	2.0000	2.0000	25.7000	0.1811
CASE	149	2.0000	2.0000	23.8000	0.1742
CASE	150	2.0000	2.0000	24.1000	0.1742
CASE	151	2.0000	2.0000	24.6000	0.2171
CASE	152	2.0000	2.0000	24.9000	0.2195
CASE	153	2.0000	2.0000	24.4000	0.1817
CASE	154	2.0000	2.0000	24.5000	0.1685
CASE	155	2.0000	2.0000	21.6000	0.1360
CASE	156	2.0000	2.0000	23.3000	0.1844
CASE	157	2.0000	2.0000	25.1000	0.2201
CASE	158	3.0000	1.0000	23.4000	0.1978
CASE	159	3.0000	1.0000	24.3000	0.2047
CASE	160	3.0000	1.0000	21.5000	0.1666
CASE	161	3.0000	1.0000	23.5000	0.2023
CASE	162	3.0000	1.0000	24.9000	0.2076
CASE	163	3.0000	1.0000	22.9000	0.2037
CASE	164	3.0000	1.0000	23.5000	0.1876
CASE	165	3.0000	1.0000	21.7000	0.1926

CASE	166	3.0000	1.0000	24.8000	0.2057
CASE	167	3.0000	1.0000	23.8000	0.1825
CASE	168	3.0000	1.0000	24.3000	0.2307
CASE	169	3.0000	1.0000	23.3000	0.1862
CASE	170	3.0000	1.0000	23.5000	0.2012
CASE	171	3.0000	1.0000	21.7000	0.2055
CASE	172	3.0000	1.0000	22.2000	0.2111
CASE	173	3.0000	1.0000	23.9000	0.2097
CASE	174	3.0000	1.0000	24.2000	0.2270
CASE	175	3.0000	1.0000	22.4000	0.1735
CASE	176	3.0000	1.0000	21.7000	0.1726
CASE	177	3.0000	1.0000	25.0000	0.2354
CASE	178	3.0000	2.0000	25.6000	0.2042
CASE	179	3.0000	2.0000	25.5000	0.2361
CASE	180	3.0000	2.0000	24.4000	0.1828
CASE	181	3.0000	2.0000	22.8000	0.1711
CASE	182	3.0000	2.0000	21.8000	0.1402
CASE	183	3.0000	2.0000	21.0000	0.1540
CASE	184	3.0000	2.0000	22.0000	0.1850
CASE	185	3.0000	2.0000	24.2000	0.1974
CASE	186	3.0000	2.0000	21.0000	0.1365
CASE	187	3.0000	2.0000	23.4000	0.1728
CASE	188	3.0000	2.0000	22.4000	0.1415
CASE	189	3.0000	2.0000	24.6000	0.2139
CASE	190	3.0000	2.0000	26.5000	0.2230
CASE	191	3.0000	2.0000	24.4000	0.2053
CASE	192	3.0000	2.0000	23.3000	0.1792
CASE	193	3.0000	2.0000	25.5000	0.2196
CASE	194	3.0000	2.0000	24.6000	0.2154
CASE	195	3.0000	2.0000	23.2000	0.1713
CASE	196	3.0000	2.0000	23.7000	0.1929
CASE	197	3.0000	2.0000	25.4000	0.1799