OFFICE OF PREVENTION,
PESTICIDES AND TOXIC
SUBSTANCES

MAY 1 6 2000

MEMORANDUM

SUBJECT: Review of Avian Reproduction and Chronic Aquatic Studies for *s*-Metolachlor (PC Code 108800) submitted under Barcode 262736 and Submission # S574334

TO: Joanne Miller, Product Manager 23
Eugene Wilson, PM Team Reviewer
Registration Division (7505C)

From: Brian Montague, Fisheries Biologist
Environmental Risk Branch I

Through: Arnet Jones, Chief   05/16/2000
Environmental Risk Branch I
Environmental Fate and Effects Division (7507C)

The Environmental Fate and Effects Division has completed review of 3 studies submitted to support registration of *s* Metolachlor herbicide products.   The studies have all been classified as acceptable for fulfillment of 71-3 avian reproduction testing with bobwhite quail, 71-4 early life stage testing with freshwater fish, and 71-4 full life cycle testing with estuarine invertebrate.

The results of the avian reproduction test (MRID 44995901) indicate that no effects to upland gamebird species are expected at food residue concentrations of up to 1000 ppm (equivalent to maximum residues from a single application at 4.1 lbs ai/A).

The chronic test with fathead minnow (MRID 44995903) has shown *s*-Metolachlor to cause chronic effects to larval growth at concentrations as low as 56 ppb. The NOEC for growth effects was determined to be 30 ppb.

The chronic toxicity test (MRID 44995902) with the estuarine invertebrate *Americamysis bahia* (formerly *Mysidopsis b.)* has shown *s*-Metolachlor to significantly effect the growth of mysids at 250 ppb and reproduction of young at 510 ppb. The NOEC for growth effects was determined to be 130 ppb ai.

Questions regarding this memorandum and the results of these studies may be directed to Brian Montague at 305-6438 or Arnet Jones at 305-7416.

DATA EVALUATION RECORD
§ 71-4 -- AVIAN REPRODUCTION TEST

1. **CHEMICAL:**   S-Metolachlor   <u>PC Code No.</u>: 108800

2. **TEST MATERIAL:**   CGA-77102   <u>Purity</u>: 98.6%

3. <u>CITATION</u>: <u>Authors</u>: M.H. Kaczor and V. Miller
   <u>Title</u>:The Reproductive Toxicity Test of CGA-77102 with the Northern Bobwhite (*Colinus virginianus*)
   <u>Study Completion Date</u>:   December 6, 1999
   <u>Laboratory</u>: EBA, Inc., Snow Camp, NC
   <u>Sponsor</u>: Novartis Crop Protection, Inc., Greensboro, NC
   <u>Laboratory Report ID</u>: 029901
   <u>MRID No.</u>:   449959-01
   <u>DP Barcode</u>:   D262736
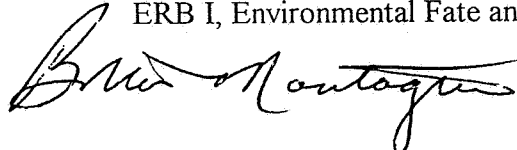
4. **REVIEWED BY:** Max Feken, M.S., Environmental Toxicologist,
                 Golder Associates, Inc.
   Signature: **Date:** 5/3/00

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

5. **APPROVED BY:** Brian Montague, Biologist
                   ERB I, Environmental Fate and Effects Division
   Signature: **Date:**5/15/00

6. **STUDY PARAMETERS:**
   Scientific Name of Test Organism: *Colinus virginianus*
   Age of Test Organisms at Test Initiation: 37 weeks
   Definitive Study Duration: 24 weeks

7. **CONCLUSIONS:** This study is scientifically sound and will meet the guideline requirements for an avian reproduction study using bobwhite quail for single applications rates which do not exceed . 4.0 lbs ai/A or seasonal application scenarios which will not exceed 1000 ppm on avian food sources. When compared to the control, there appeared to be no significant treatment related effects on any of the parameters measured at any concentrations tested (i.e., 250, 500, and 1000 ppm).

Results Synopsis
<u>Most sensitive endpoints</u>: No statistically significant adverse effects.
<u>NOEC</u>: 1000 ppm   <u>LOEC</u>: >1000 ppm

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

    A. Classification: Core

    B.   Rationale: None of the parameters were affected at any test concentrations. *S*-metolachlor residues are not expected to exceed 1000 ppm under proposed label use scenarios.

    C.   Repairability: Not applicable at this time.

9. <u>GUIDELINE DEVIATIONS</u>: None.

10. <u>SUBMISSION PURPOSE</u>: This study was submitted to fulfill avian reproduction data requirements for the s isomer of metolachlor.

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

    A. Test Organisms

Guideline Criteria	Reported Information
<u>Species</u> A wild waterfowl species, preferably the mallard (*Anas platyrhynchos*), or an upland game species, preferably the northern bobwhite (*Colinus virginianus*)	Northern bobwhite (*Colinus virginianus*)
<u>Age at beginning of test</u> Birds should be approaching their first breeding season.	37 weeks old; birds were approaching their first breeding season.
<u>Supplier</u> All birds should be from the same source.	Buffalo Creek Quail Farm, Ellerbe, NC
Were birds pen-reared?	Yes
Were birds phenotypically indistinguishable from wild birds?	Yes

Guideline Criteria	Reported Information
Health observation period 2 to 6 weeks.	2 weeks
Were birds healthy and without excessive mortality prior to the test?	Yes

B. Test System

Guideline Criteria	Reported Information
Were pens for adult birds of adequate size and designed to conform to good husbandry practices?	Yes
Were pens for chicks of adequate size and designed to conform to good husbandry practices?	Yes
Were pens constructed of a nonbinding material such as galvanized or stainless steel?	Yes
Was adequate ventilation provided?	Yes
Temperature Approx. 21°C (70°F)	Mean: 22.3°C SD: 2.7°C
Relative humidity Approx. 55%	Mean: 51.5% SD: 22.5%
Lighting First 8 weeks: 7 h per day. Thereafter: 16-17 h per day. At least 6 footcandles at bird level.	First 8 weeks: 7 h per day Thereafter: 17 h per day Mean illumination: 7.5 foot-candles
Diet A commercial breeder feed (or its equivalent) that is appropriate for the test species.	Adults were fed Purina Game Bird Ration Layena: >20% protein >2.5% fat <7.0% fiber Chicks were fed Purina Startena game ration.

Guideline Criteria	Reported Information
Preparation of test diet A premixed containing the test substance should be mechan-ically mixed with basal diet. If an evaporative vehicle is used, it must be completely evaporated prior to feeding.	Test diets were prepared by mixing the test compound directly into the basal diet. The measuring beaker was rinsed with approximately 10 ml of acetone. Similar amounts of acetone were added to the control diet. Acetone was allowed to evaporate from the diet before use.
Was the premix stored under conditions which maintain stability?	Yes
Was the diet analyzed to verify homogeneity and stability of the test substance?	Yes
Replenishment of feed	Adult diets were prepared approximately every 3 weeks. Feed and water were provided *ad libitum* for the adults and offspring.

C. Test Design

Guideline Criteria	Reported Information
Nominal concentrations At least two concentrations other than the control are required; three or more are strongly recommended. The highest test concentrations should show a significant effect or be at or above the maximum field residue level.	Nominal concentrations: Control, 250, 500 and 1000 ppm. Max. residue level: not reported.
Control Vehicle control.	No vehicle was used.
Vehicle Corn oil or other appropriate vehicle.	N/A
Vehicle amount (% of diet by weight) Not more than 2%.	N/A

Guideline Criteria	Reported Information
Number of birds per pen One male and 1 female per pen is strongly recommended. For quail, 1 male and 2 females may be acceptable.	1 male and 1 female per pen
Number of pens per group At least 12 pens are required for bobwhite, but considerably more may be needed if birds are kept in pairs.	19 pens per group
Pre-laying exposure duration At least 10 weeks prior to the onset of egg-laying.	13 weeks
Exposure duration with egg-laying At least 10 weeks.	11 weeks
Withdrawal period If reduced reproduction is evident, a withdrawal period of up to 3 weeks may be added to the test phase.	N/A

D. Egg Collection and Incubation

Guideline Criteria	Reported Information
Were eggs collected daily?	Yes
Egg storage temperature Approximately 16°C (61°F)	14.6 ± 2.5°C
Egg storage humidity Approximately 65%	63.2 ± 13.4%
Were eggs set weekly?	Yes
Were eggs candled for cracks prior to being set for incubation on Day 0?	Yes
Candling for fertility Quail: approx. Day 11	Eggs were candled on day 14 for fertility and day 21 for embryo survival.

Guideline Criteria	Reported Information
Transfer of eggs to hatcher Bobwhite: Day 21	Eggs were transferred on Day 21.
Hatching temperature 39°C (102°F) is recommended	36.9 - 37.6°C
Hatching humidity 70% is recommended	71-75%
Day after egg set that chicks were removed and counted Bobwhite: ·Day 24	Chicks that had hatched were removed and counted on Day 24. All remaining hatchlings and unhatched eggs were removed on Day 25.

E. Eggshell Thickness Measurement

Guideline Criteria	Reported Information
Collection Schedule At least once every two weeks (Week 1, 3, 5, 7 and 9).	One egg was collected weekly, when available, for eggshell thickness from odd numbered pens during odd numbered weeks and from even numbered pen during even numbered weeks.
Were shells opened, washed, and air dry for at least 48 hours before measuring?	Yes; shells air dried for at least one week.
Measurement 3-4 measurements per eggs to the nearest 0.01 mm.	5 measurements to the nearest 0.001 mm.

12. REPORTED RESULTS:

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes

Guideline Criteria	Reported Information
Did diet analysis verify the concentrations of test material?	Yes, mean concentration of test material in the test diets were 103.2 - 103.7% of nominal.
Did diet analysis show that the test substance was stable and homogeneous?	Yes
Were body weights of adults reported for test initiation and biweekly up to week 8 or the onset of egg laying?	Yes
Was average food consumption of adults reported at least biweekly?	Yes
<u>**Reproductive Endpoints**</u> The following endpoints should be reported: • Eggs laid • Eggs cracked • Eggs set • Viable embryos • Live 3-week embryos • Normal hatchlings • 14-day-old survivors • Weights of 14-day-old survivors • Egg shell thickness • Total food consumption • Initial and final body weights, by sex	All endpoints listed at left plus hatchling weight.
Were data reported by pen for all endpoints?	Yes

<u>Significant Results</u>: There were no overt signs of toxicity or treatment related mortalities at any test concentration (i.e., 250, 500, and 1000 ppm). Early on during the egg laying period, a number of females apparently died from impacted eggs. The authors determined that the Purina basal diet for the most recently mixed lot was deficient in Vitamin D which effected calcium content of the egg shells. The diet was immediately reformulated with a different lot of feed and no further mortalities occurred. Overall, the reviewer believes that this event had no adverse impact on the integrity of the study. No mortalities occurred in the control.

When compared to the control, there were no significant reductions in adult body weight or feed consumption. Based on this determination no significant treatment related reductions in any of the reproductive parameters measured at any test concentration are apparent when compared to the control.

13. VERIFIED STATISTICAL RESULTS:

Means of Endpoints

Endpoint	Control	250 ppm	500 ppm	1000 ppm
Eggs laid (EL)	58 (11)	60 (17)	62 (8)	59 (14)
Eggs cracked (EC)	0.8 (1.2)	0.4 (1.0)	0.6 (1.1)	0.7 (0.7)
Eggs set (ES)	52 (11)	55 (16)	56 (8)	54 (13)
Viable embryos (VE)	47 (13)	50 (19)	53 (9)	48 (14)
Live 3-wk embryos (LE)	47 (14)	50 (19)	52 (9)	48 (14)
Normal hatchlings (NH)	45 (14)	48 (18)	50 (10)	45 (14)
14-day-old survivors (HS)	38 (12)	44 (17)	48 (10)	40 (13)
Egg shell thickness (THICK)	0.201 (0.008)	0.202 (0.005)	0.203 (0.007)	0.199 (0.007)
Hatchling weight (HATWT)	7.5 (0.5)	7.5 (0.6)	7.5 (0.5)	7.6 (0.3)
14-day-old survivor weight (SURVWT)	27.6 (2.3)	28.9 (2.3)	26.6 (2.2)	27.2 (2.0)
Mean food consumption (FOOD)	20.9 (1.9)	20.0 (1.8)	21.8 (2.4)	20.4 (1.8)
Final weight of males (POSTM)	236 (20)	238 (24)	238 (29)	227 (20)
Final weight of females (POSTF)	266 (16)	255 (32)	270 (25)	262 (28)

Statistically Significant Endpoints: No significant treatment related effects

14. **REVIEWER'S COMMENTS:** When compared to the control, there were no treatment related effects on any of the parameters measured at any concentration tested (i.e., 250, 500, and 1000 ppm). Though some differences among treatments were above the 0.05 percent level considered significant, they were not dose dependent and were not significantly different from the control groups with the possible exception of the ratio of normal hatchlings to 3 week live embryos for group 3 and the controls. Further examination of this difference determined that it appeared driven by a single pen value. The highest dosage level (1000 ppm) was at or above the maximum expected field residue level from the highest proposed application rates. The study is classified as **core.**

REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
CGA-77102:

OBS	LEVEL	EL	EC	ES	VE	LE	NH	HS	THICK	HATWT
1	CONTROL	59	1	53	53	53	53	40	0.203	7.472
2	CONTROL	64	0	59	58	58	57	53	0.203	7.126
3	CONTROL	62	0	57	54	54	53	45	0.197	7.970
4	CONTROL	64	0	59	53	52	46	36	0.202	7.963
5	CONTROL	29	1	24	22	22	20	20	0.222	8.090
6	CONTROL	38	0	34	50	47	22	21	0.199	7.868
7	CONTROL	68	1	62	60	47	47	39	0.208	7.315
8	CONTROL	68	0	60	54	53	59	43	0.198	6.988
9	CONTROL	61	2	56	54	53	52	44	0.198	7.531
10	CONTROL	69	0	64	37	64	64	57	0.204	7.372
11	CONTROL	47	0	41	45	37	36	35	0.183	8.028
12	CONTROL	65	4	56	22	44	16	41	0.196	6.732
13	CONTROL	47	2	40	37	19	35	11	0.212	7.238
14	CONTROL	47	1	41	44	36	43	32	0.205	7.506
15	CONTROL	61	0	56	58	58	56	33	0.198	6.633
16	CONTROL	63	0	58	49	49	48	52	0.206	8.127
17	CONTROL	55	1	60	59	59	57	44	0.193	7.900
18	CONTROL	66	3	63	59	57	56	34	0.201	7.380
19	CONTROL	72	0	61	56	56	54	50	0.199	6.305
20	CONTROL	66	0	59	56	57	54	54	0.200	7.371
21	TRT1	64	1	59	59	58	45		0.200	7.200
22	TRT1	65	1	59	59	57	1	29	0.195	6.991
23	TRT1		4	49	1	1	32	42		8.179
24	TRT1	54	0	56	33	33	47	47	0.200	7.098
25	TRT1	73	0	68	68	68	67	60	0.206	6.864
26	TRT1	54	0	49	48	48	47		0.201	
27	TRT1	60	0	55	54	54	50			
28	TRT1						51	44	0.195	7.359
29		62	1	56	55	55	51	44	0.195	7.359
30		84	4	75	69	68	63	60	0.201	7.663

OBS	LEVEL	FOOD	SURVWT	PREM	POSTM	PREF	POSTF
1	CONTROL	18.4	21.5	231.5	226.8	216.0	270.4
2	CONTROL	18.3	25.8	205.5	206.9	207.5	256.2
3	CONTROL	24.7	27.6	230.0	254.8	225.0	281.8
4	CONTROL	19.9	26.1	202.0	234.7	205.5	266.7
5	CONTROL	20.5	27.4	251.0	241.5	236.5	293.1
6	CONTROL	23.3	28.8	224.5	268.2	222.0	265.3
7	CONTROL	20.8	28.8	220.5	234.0	211.5	262.8
8	CONTROL	22.0	28.0	211.5	216.9	214.5	275.5
9	CONTROL	23.3	28.2	209.0	234.9	215.0	264.0
10	CONTROL	22.5	30.0	232.5	235.2	222.5	277.5
11	CONTROL	23.3	31.1	213.5	232.9	203.5	272.8
12	CONTROL	19.8	26.0	219.5	254.0	209.5	261.8
13	CONTROL	19.0	28.8	227.0	261.0	220.5	271.2
14	CONTROL	19.6	28.8	247.0	289.7	225.0	271.4
15	CONTROL	20.6	29.9	201.5	208.9	194.5	250.0
16	CONTROL	22.0	24.8	215.0	227.7	201.5	237.0
17	CONTROL	22.8	31.4	224.5	228.7	186.5	279.8
18	CONTROL	19.1	27.3	215.0	219.4	198.0	279.8
19	CONTROL	21.7	26.6	201.0	239.4	192.5	265.2
20	CONTROL	21.4	26.9	202.5	204.5	205.5	244.5
21	TRT1	19.4	24.7	191.5	204.5	205.0	215.0
22	TRT1	21.3	28.6	206.0	261.0	224.0	243.0
23	TRT1	22.5	32.9	233.5	220.0	210.5	180.9
24	TRT1	16.3	29.7	226.5	275.3	210.5	233.3
25	TRT1	20.1	27.6	219.0	234.7	213.0	285.4
26	TRT1	22.3	28.2	250.0	256.5	209.5	273.6
27	TRT1	18.7	30.0	238.5	257.2	186.0	261.3
28	TRT1	20.1	25.0	200.5	205.0	226.0	
29		23.0	27.8	249.0	272.3	226.0	301.8
30		19.4	28.0	206.5	216.1	224.5	273.9

OBS	LEVEL	EL	EC	ES	VE	LE	NH	HS	THICK	HATWT
31	TRT1	67	.	61	59	57	54	50	0.204	8.193
32	TRT1	70	0	65	64	64	60	53	0.205	8.543
33	TRT1	68	0	65	65	64	62	61	0.217	7.742
34	TRT1	61	0	56	55	55	53	48	0.202	8.179
35	TRT1	59	0	54	53	52	51	46	0.207	6.759
36	TRT1	52	0	47	6	6	6	5	0.199	7.400
37	TRT1	54	1	49	46	46	46	45	0.198	7.170
38	TRT2	69	0	63	61	61	57	56	0.200	7.514
39	TRT2	67	1	62	62	62	62	61	0.189	7.866
40	TRT2	56	3	48	47	46	46	46	0.200	8.230
41	TRT2	65	0	60	60	59	59	57	0.203	8.051
42	TRT2	60	0	55	54	54	54	50	0.202	7.792
43	TRT2	39	4	34	33	33	33	31	0.200	7.294
44	TRT2	64	0	55	51	49	45	42	0.200	6.973
45	TRT2	63	0	58	58	58	58	49	0.206	7.496
46	TRT2	70	0	65	65	65	65	59	0.209	7.430
47	TRT2	52	0	47	46	46	46	38	0.197	6.835
48	TRT2	61	1	56	58	55	55	51	0.213	6.948
49	TRT2	69	0	63	58	58	58	52	0.204	7.793
50	TRT2	65	0	60	38	38	38	33	0.208	7.409
51	TRT2	66	1	59	59	57	57	57	0.204	8.533
52	TRT2	50	1	46	46	46	46	39	0.198	7.553
53	TRT2	71	0	66	57	57	46	49	0.214	6.460
54	TRT2	.	.	54	41	37	32	31	0.192	7.019
55	TRT2	59	0	59	59	59	59	55	0.212	7.766
56	TRT2	64	1	62	60	59	53	41	0.204	7.994
57	TRT2	68	0	62	60	59	60	52	0.199	7.772
58	TRT3	67	1	61	58	58	57	52	0.194	7.391
59	TRT3									
60	TRT3									

OBS	LEVEL	FOOD	SURVWT	PREM	POSTM	PREF	POSTF
31	TRT1	19.5	31.0	236.0	251.3	222.5	277.3
32	TRT1	19.6	29.6	196.0	229.7	205.5	262.5
33	TRT1	20.7	32.5	215.0	228.1	197.5	253.6
34	TRT1	19.3	31.6	222.0	259.8	204.5	268.7
35	TRT1	19.4	26.4	214.0	248.9	220.0	301.9
36	TRT1	19.4	28.2	222.5	232.4	239.5	223.2
37	TRT1	16.6	29.3	214.5	198.9	176.5	234.5
38	TRT2	23.1	28.7	190.0	224.7	185.5	234.5
39	TRT2	23.5	28.3	216.0	249.7	225.5	271.5
40	TRT2	23.8	28.6	239.0	222.6	230.5	293.6
41	TRT2	20.6	26.8	230.5	221.0	216.5	276.8
42	TRT2	24.3	25.3	220.0	208.3	204.5	260.4
43	TRT2	21.2	27.3	206.5	245.9	207.5	243.4
44	TRT2	21.4	24.4	207.0	225.8	205.5	253.5
45	TRT2	19.1	29.5	218.5	308.2	239.5	322.8
46	TRT2	19.7	22.5	220.0	248.6	217.0	265.6
47	TRT2	22.2	25.6	251.0	218.4	203.5	247.1
48	TRT2	25.3	26.0	223.5	206.0	259.4	259.4
49	TRT2	27.6	27.6	228.0	284.8	225.0	284.8
50	TRT2	23.0	29.5	201.0	280.6	237.5	282.6
51	TRT2	18.1	28.2	239.5	208.6	221.0	251.6
52	TRT2	19.9	22.0	247.0	232.9	217.0	277.4
53	TRT2			225.5	210.9	196.0	216.5
54	TRT2	17.9	25.5	219.0	228.5	168.0	293.2
55	TRT2	19.8	24.9	186.0	243.0	222.0	290.3
56	TRT2	22.2	24.6	190.5	222.1	225.0	271.9
57	TRT2	20.4	27.0	207.5	218.4	211.5	230.6
58	TRT3	20.2	27.5	205.5	218.4	214.0	
59	TRT3			203.5			
60	TRT3			227.0			

OBS	LEVEL	EL	EC	ES	VE	LE	NH	HS	THICK	HATWT
61	TRT3	55	1	49	46	46	44	36	0.194	7.423
62	TRT3	64	0	59	59	59	58	55	0.203	7.464
63	TRT3	66	0	61	59	59	59	52	0.189	7.498
64	TRT3	71	1	66	65	65	59	51	0.193	7.303
65	TRT3	75	1	69	39	38	37	34	0.206	8.081
66	TRT3	61	1	55	55	55	50	45	0.210	7.366
67	TRT3	37	0	33	28	28	21	21	0.204	7.567
68	TRT3	34	2	30	17	17	47	12	0.201	7.718
69	TRT3	61	1	54	52	51	47	41	0.199	7.128
70	TRT3	31	2	27	25	25	22	21	0.199	7.773
71	TRT3	64	1	58	48	47	41	37	0.204	7.534
72	TRT3	.	.	.	.	.	.	.	.	.
73	TRT3	.	.	.	.	.	.	.	.	.
74	TRT3	55	0	50	44	44	42	40	0.198	7.093
75	TRT3	69	2	62	59	59	57	44	0.187	7.788
76	TRT3									

OBS	SURVWT	FOOD	PREM	POSTM	PREF	POSTF
61	23.2	21.1	206.5	224.9	189.0	236.0
62	26.2	21.7	206.5	230.3	218.5	278.0
63	30.9	21.5	208.5	222.8	195.0	228.6
64	26.3	19.5	223.5	232.5	230.5	264.0
65	28.7	21.1	251.5	248.6	235.5	294.0
66			229.5		211.5	
67	30.3	21.1	220.5	227.9	226.0	278.6
68	29.4	20.8	222.0	215.9	212.5	244.1
69	28.3	19.2	230.5	224.5	223.0	244.5
70	27.2	20.0	247.0	263.3	210.5	267.8
71	25.9	16.3	193.5	194.5	204.5	243.4
72	27.1	20.8	231.0	262.2	238.0	310.9
73			218.0		218.0	
74			196.0		200.5	
75	26.5	17.4	195.0	187.0	181.5	215.2
76	26.6	23.8	215.0	221.1	229.0	297.6

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
11:07 Wednesday, April 12, 2000

	LEVEL			
	CONTROL	TRT1	TRT2	TRT3
	MEAN	MEAN	MEAN	MEAN
EL	58.16	59.65	61.67	59.06
EC	0.84	0.35	0.56	0.69
ES	52.26	54.65	56.11	53.63
VE	47.37	49.88	52.78	48.38
LE	46.68	49.53	52.22	48.13
NH	45.47	47.59	50.11	45.19
HS	38.37	43.53	47.56	39.63
ES/EL (%)	89.54	92.07	90.86	90.50
(EL-EC)/EL (%)	98.54	99.53	99.11	98.83
VE/ES (%)	89.51	90.61	94.25	89.41
LE/VE (%)	98.21	99.41	98.84	99.49

	CONTROL	TRT1	TRT2	TRT3
NH/EL (%)	76.87	80.10	81.29	75.20
NH/ES (%)	85.66	86.82	89.50	83.02
NH/LE (%)	96.86	96.62	95.66	93.37
HS/ES (%)	73.10	79.86	84.86	72.98
HS/NH (%)	85.01	91.49	94.86	87.86
THICK	0.20	0.20	0.20	0.20
HATWT	7.49	7.47	7.50	7.56
SURVWT	27.58	28.89	26.59	27.23
FOOD	20.93	19.96	21.79	20.44
POSTM	236.25	238.34	238.25	227.49
POSTF	265.72	254.96	269.81	262.19

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
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-------- LEVEL=CONTROL --------

Variable	Label	N	Mean	Std Dev	CV
EL		19	58.158	11.486	19.749
EC		19	0.842	1.167	138.616
ES		19	52.263	11.050	21.142
VE		19	47.368	13.450	28.395
LE		19	46.684	13.687	29.319
NH		19	45.474	13.854	30.466
HS		19	38.368	11.767	30.669
THICK		19	0.201	0.008	3.946
HATWT		19	7.491	0.459	6.125
SURVWT		19	27.584	2.326	8.431
FOOD		19	20.932	1.945	9.293
PREM		19	218.500	15.055	6.890
POSTM		19	236.253	15.839	6.398
PREF		19	210.921	12.940	6.135
POSTF		19	265.716	16.479	6.202
ES_EL	ES/EL (%)	19	89.540	2.856	3.190
NH_EL	NH/EL (%)	19	76.873	14.196	18.466
ENC_EL	(EL-EC)/EL (%)	19	98.538	1.902	1.931
VE_ES	VE/ES (%)	19	89.512	12.591	14.067
NH_ES	NH/ES (%)	19	85.661	14.794	17.271
HS_ES	HS/ES (%)	19	73.101	15.777	21.582
LE_VE	LE/VE (%)	19	98.213	3.309	3.370
NH_LE	NH/LE (%)	19	96.860	4.321	4.461
HS_NH	HS/NH (%)	19	85.008	10.511	12.365

-------- LEVEL=TRT1 --------

Variable	Label	N	Mean	Std Dev	CV
EL		17	59.647	17.124	28.709
EC		17	0.353	0.996	282.290
ES		17	54.647	15.736	28.795
VE		17	49.882	19.484	39.059
LE		17	49.529	19.284	38.935
NH		17	47.588	18.378	38.619
HS		17	43.529	17.103	39.291

POSTM	16	227.494	20.474	9.000
PREF	19	214.421	15.377	7.171
POSTF	16	262.188	28.412	10.836
ES_EL	ES/EL (%)	16	90.501	1.728	1.909
NH_EL	NH/EL (%)	16	75.205	13.384	17.796
ENC_EL	(EL-EC)/EL (%)	16	98.830	1.218	1.233
VE_ES	VE/ES (%)	16	89.410	13.741	15.368
NH_ES	NH/ES (%)	16	83.016	14.183	17.084
HS_ES	HS/ES (%)	16	72.978	13.855	18.985
LE_VE	LE/VE (%)	16	99.485	0.936	0.941
NH_LE	NH/LE (%)	16	93.367	6.468	6.927
HS_NH	HS/NH (%)	16	87.865	7.797	8.874

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
1. ANALYSIS OF EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
1. ANALYSIS OF EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
1. ANALYSIS OF EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: EL

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	120.99669	40.33223	0.24	0.8658
Error	66	10939.34617	165.74767		
Corrected Total	69	11060.34286			

R-Square	C.V.	Root MSE	EL Mean
0.010940	21.59083	12.874	59.629

	Label				
THICK			0.202	0.005	2.623
HATWT			7.473	0.607	8.120
SURVWT			28.838	2.332	8.074
FOOD			19.965	1.844	9.236
PREM			217.579	18.090	8.314
POSTM			238.335	24.147	10.132
PREF			206.579	18.372	8.894
POSTF			254.965	31.670	12.421
ES_EL	ES/EL (%)		92.072	2.493	2.707
NH_EL	NH/EL (%)		80.096	19.541	24.397
ENC_EL	(EL-EC)/EL (%)		99.535	1.224	1.229
VE_ES	VE/ES (%)		90.606	21.486	23.714
NH_ES	NH/ES (%)		86.819	20.572	23.695
HS_ES	HS/ES (%)		79.882	19.882	24.895
LE_VE	LE/VE (%)		99.414	1.017	1.023
NH_LE	NH/LE (%)		96.620	2.821	2.920
HS_NH	HS/NH (%)		91.490	4.954	5.415

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
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--------- LEVEL=TRT2 ---------

Variable	Label	N	Mean	Std Dev	CV
EL		18	61.667	8.160	13.233
EC		18	0.556	1.149	206.825
ES		18	56.111	8.058	14.360
VE		18	52.778	9.033	17.115
LE		18	52.222	9.334	17.874
NH		18	50.111	9.934	19.825
HS		18	47.556	9.751	20.505
THICK		18	0.203	0.007	3.321
HATWT		18	7.498	0.524	6.994
SURVWT		18	26.594	2.225	8.365
FOOD		18	21.789	2.449	11.241
PREM		19	219.789	17.577	7.997
POSTM		18	238.250	29.392	12.337
PREF		19	213.816	16.603	7.765
POSTF		19	269.806	24.962	9.252
ES_EL	ES/EL (%)	18	90.857	2.287	2.517
NH_EL	NH/EL (%)	18	81.293	11.653	14.334
ENC_EL	(EL-EC)/EL (%)	18	99.110	1.879	1.896
VE_ES	VE/ES (%)	18	94.249	9.895	10.499
NH_ES	NH/ES (%)	18	89.498	12.691	14.180
HS_ES	HS/ES (%)	18	84.863	12.443	14.663
LE_VE	LE/VE (%)	18	98.841	2.487	2.517
NH_LE	NH/LE (%)	18	95.664	4.037	4.220
HS_NH	HS/NH (%)	18	94.857	3.530	3.721

--------- LEVEL=TRT3 ---------

Variable	Label	N	Mean	Std Dev	CV
EL		16	59.063	13.518	22.887
EC		16	0.688	0.704	102.422
ES		16	53.625	12.873	24.006
VE		16	48.375	14.361	29.688
LE		16	48.125	14.343	29.803
NH		16	45.188	14.419	31.908
HS		16	39.625	12.612	31.827
THICK		16	0.199	0.007	3.352
HATWT		16	7.556	0.282	3.738
SURVWT		16	27.231	1.980	7.273
FOOD		16	20.444	1.784	8.725
PREM		19	217.395	16.465	7.574

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 165.7477
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-5.412	3.509	12.429
TRT1 - CONTROL	-7.565	1.489	10.544
TRT3 - CONTROL	-8.298	0.905	10.107

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
2. ANALYSIS OF EGGS CRACKED
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
2. ANALYSIS OF EGGS CRACKED
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
2. ANALYSIS OF EGGS CRACKED
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: EC   Sum of   Mean

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	120.99669	40.33223	0.24	0.8658

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
1. ANALYSIS OF EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	EL LSMEAN	i/j	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) 1	2	3	4
CONTROL	58.1578947	1		0.7301	0.4103	0.8366
TRT1	59.6470588	2	0.7301		0.6443	0.8967
TRT2	61.6666667	3	0.4103	0.6443		0.5581
TRT3	59.0625000	4	0.8366	0.8967	0.5581	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
1. ANALYSIS OF EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: EL

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 165.7477
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - TRT1	-9.457	2.020	13.496
TRT2 - TRT3	-9.055	2.604	14.263
TRT2 - CONTROL	-7.652	3.509	14.670
TRT1 - TRT2	-13.496	-2.020	9.457
TRT1 - TRT3	-11.235	0.585	12.404
TRT1 - CONTROL	-9.839	1.489	12.818
TRT3 - TRT2	-14.263	-2.604	9.055
TRT3 - TRT1	-12.404	-0.585	11.235
TRT3 - CONTROL	-10.609	0.905	12.418
CONTROL - TRT2	-14.670	-3.509	7.652
CONTROL - TRT1	-12.818	-1.489	9.839
CONTROL - TRT3	-12.418	-0.905	10.609

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
1. ANALYSIS OF EGGS LAID
****

Source	DF	Squares	Square	F Value	Pr > F
Model	3	2.2951011	0.7650337	0.72	0.5446
Error	66	70.2906132	1.0650093		
Corrected Total	69	72.5857143			

R-Square	C.V.	Root MSE	EC Mean
0.031619	167.9988	1.0320	0.6143

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	2.2951011	0.7650337	0.72	0.5446

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
2. ANALYSIS OF EGGS CRACKED
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	EC LSMEAN	i/j	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) 1	2	3	4
CONTROL	0.84210526	1	.	0.1604	0.4016	0.6603
TRT1	0.35294118	2	0.1604	.	0.5635	0.3554
TRT2	0.55555556	3	0.4016	0.5635	.	0.7110
TRT3	0.68750000	4	0.6603	0.3554	0.7110	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
2. ANALYSIS OF EGGS CRACKED
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: EC

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 1.065009
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONTROL - TRT3	-0.7683	0.1546	1.0775
CONTROL - TRT2	-0.6081	0.2865	1.1812
CONTROL - TRT1	-0.4189	0.4892	1.3972
TRT3 - CONTROL	-1.0775	-0.1546	0.7683
TRT3 - TRT2	-0.8026	0.1319	1.0665
TRT3 - TRT1	-0.6129	0.3346	1.2820
TRT2 - CONTROL	-1.1812	-0.2865	0.6081

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - TRT3	-1.0665	-0.1319	0.8026
TRT2 - TRT1	-0.7173	-0.2026	1.1225
TRT1 - CONTROL	-1.3972	-0.4892	0.4189
TRT1 - TRT3	-1.2820	-0.3346	0.6129
TRT1 - TRT2	-1.1225	-0.2026	0.7173

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
2. ANALYSIS OF EGGS CRACKED
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 1.065009
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT3 - CONTROL	-0.8923	-0.1546	0.5831
TRT2 - CONTROL	-1.0016	-0.2865	0.4285
TRT1 - CONTROL	-1.2150	-0.4892	0.2366

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
3. ANALYSIS OF EGGS SET
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
3. ANALYSIS OF EGGS SET
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients
INTERCEPT	0
LEVEL CONTROL	L2
TRT1	L3
TRT2	L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
3. ANALYSIS OF EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: ES

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	145.47709	48.49236	0.33	0.8049
Error	66	9749.09434	147.71355		
Corrected Total	69	9894.57143			

R-Square	C.V.	Root MSE	ES Mean
0.014703	22.44755	12.154	54.143

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	145.47709	48.49236	0.33	0.8049

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
3. ANALYSIS OF EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	ES LSMEAN	Pr > $|T|$ H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	52.2631579	1	.	0.5589	0.3393	0.7423
TRT1	54.6470588	2	0.5589	.	0.7228	0.8100
TRT2	56.1111111	3	0.3393	0.7228	.	0.5537
TRT3	53.6250000	4	0.7423	0.8100	0.5537	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
3. ANALYSIS OF EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: ES

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 147.7136
Critical Value of Studentized Range= 3.727

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

	Simultaneous Lower Confidence	Difference Between	Simultaneous Upper Confidence

Comparison	Limit	Means	Limit
TRT2 - TRT1	-9.370	1.464	12.298
TRT2 - TRT3	-8.520	2.486	13.493
TRT2 - CONTROL	-6.689	3.848	14.384
TRT1 - TRT2	-12.298	-1.464	9.370
TRT1 - TRT3	-10.136	1.022	12.180
TRT1 - CONTROL	-8.311	2.384	13.078
TRT3 - TRT2	-13.493	-2.486	8.520
TRT3 - TRT1	-12.180	-1.022	10.136
TRT3 - CONTROL	-9.508	1.362	12.231
CONTROL - TRT2	-14.384	-3.848	6.689
CONTROL - TRT1	-13.078	-2.384	8.311
CONTROL - TRT3	-12.231	-1.362	9.508

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
3. ANALYSIS OF EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 147.7136
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-4.573	3.848	12.269
TRT1 - CONTROL	-6.164	2.384	10.932
TRT3 - CONTROL	-7.326	1.362	10.049

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
4. ANALYSIS OF VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
4. ANALYSIS OF VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
4. ANALYSIS OF VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: VE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	301.75313	100.58438	0.48	0.6968
Error	66	13811.04687	209.25829		
Corrected Total	69	14112.80000			

R-Square	C.V.	Root MSE	VE Mean
0.021382	29.16484	14.466	49.600

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	301.75313	100.58438	0.48	0.6968

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
4. ANALYSIS OF VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	VE LSMEAN	i/j	1	2	3	4
			Pr > |T| HO: LSMEAN(i)=LSMEAN(j)			
CONTROL	47.3684211	1	.	0.6044	0.2597	0.8381
TRT1	49.8823529	2	0.6044	.	0.5560	0.7658
TRT2	52.7777778	3	0.2597	0.5560	.	0.3789
TRT3	48.3750000	4	0.8381	0.7658	0.3789	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
4. ANALYSIS OF VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: VE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 209.2583
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - TRT1	-9.999	2.895	15.790
TRT2 - TRT3	-8.698	4.403	17.503
TRT2 - CONTROL	-7.132	5.409	17.950
TRT1 - TRT2	-15.790	-2.895	9.999
TRT1 - TRT3	-11.773	1.507	14.788
TRT1 - CONTROL	-10.215	2.514	15.243
TRT3 - TRT2	-17.503	-4.403	8.698
TRT3 - TRT1	-14.788	-1.507	11.773
TRT3 - CONTROL	-11.931	1.007	13.944
CONTROL - TRT2	-17.950	-5.409	7.132
CONTROL - TRT1	-15.243	-2.514	10.215
CONTROL - TRT3	-13.944	-1.007	11.931

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
4. ANALYSIS OF VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 209.2583
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-4.614	5.409	15.433
TRT1 - CONTROL	-7.660	2.514	12.688
TRT3 - CONTROL	-9.333	1.007	11.347

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
5. ANALYSIS OF LIVE 3-WEEK EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

with pre-planned comparisons should be used.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
5. ANALYSIS OF LIVE 3-WEEK EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: LE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 210.4424
Critical Value of Studentized Range= 3.727

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

| | Simultaneous Lower Confidence Limit | Difference Between Means | Simultaneous Upper Confidence Limit |
LEVEL Comparison			
TRT2 - TRT1	-10.238	2.693	15.624
TRT2 - TRT3	-9.040	4.097	17.235
TRT2 - CONTROL	-7.038	5.538	18.114
TRT1 - TRT2	-15.624	-2.693	10.238
TRT1 - TRT3	-11.914	1.404	14.722
TRT1 - CONTROL	-9.920	2.845	15.610
TRT3 - TRT2	-17.235	-4.097	9.040
TRT3 - TRT1	-14.722	-1.404	11.914
TRT3 - CONTROL	-11.533	1.441	14.414
CONTROL - TRT2	-18.114	-5.538	7.038
CONTROL - TRT1	-15.610	-2.845	9.920
CONTROL - TRT3	-14.414	-1.441	11.533

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
5. ANALYSIS OF LIVE 3-WEEK EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 210.4424
Critical Value of Dunnett's T= 2.107

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

| | Simultaneous Lower Confidence Limit | Difference Between Means | Simultaneous Upper Confidence Limit |
LEVEL Comparison			
TRT2 - CONTROL	-4.514	5.538	15.590
TRT1 - CONTROL	-7.357	2.845	13.048
TRT3 - CONTROL	-8.928	1.441	11.810

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
5. ANALYSIS OF LIVE 3-WEEK EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
5. ANALYSIS OF LIVE 3-WEEK EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: LE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	304.64119	101.54706	0.48	0.6955
Error	66	13889.20167	210.44245		
Corrected Total	69	14193.84286			

R-Square	C.V.	Root MSE	LE Mean
0.021463	29.52790	14.507	49.129

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	304.64119	101.54706	0.48	0.6955

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
5. ANALYSIS OF LIVE 3-WEEK EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

| LEVEL | LE LSMEAN | Pr > \|T\| HO: LSMEAN(i)=LSMEAN(j) | | | |
		i/j	1	2	3	4
CONTROL	46.6842105	1	.	0.5589	0.2500	0.7707
TRT1	49.5294118	2	0.5589	.	0.5849	0.7819
TRT2	52.2222222	3	0.2500	0.5849	.	0.4140
TRT3	48.1250000	4	0.7707	0.7819	0.4140	.

NOTE: To ensure overall protection level, only probabilities associated

6. ANALYSIS OF NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	NH LSMEAN	LSMEAN Number
CONTROL	45.4736842	1
TRT1	47.5882353	2
TRT2	50.1111111	3
TRT3	45.1875000	4

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

i/j	1	2	3	4
1		0.6611	0.3306	0.9534
2	0.6611		0.6058	0.6334
3	0.3306	0.6058		0.3228
4	0.9534	0.6334	0.3228	

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
6. ANALYSIS OF NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: NH

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 206.895
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Difference Between Means	Simultaneous Lower Confidence Limit	Simultaneous Upper Confidence Limit
TRT2 - TRT1	2.523	-10.299	15.345
TRT2 - CONTROL	4.637	-7.832	17.107
TRT2 - TRT3	4.924	-8.103	17.950
TRT1 - TRT2	-2.523	-15.345	10.299
TRT1 - CONTROL	2.115	-10.542	14.771
TRT1 - TRT3	2.401	-10.804	15.606
CONTROL - TRT2	-4.637	-17.107	7.832
CONTROL - TRT1	-2.115	-14.771	10.542
CONTROL - TRT3	0.286	-12.578	13.150
TRT3 - TRT2	-4.924	-17.950	8.103
TRT3 - TRT1	-2.401	-15.606	10.804
TRT3 - CONTROL	-0.286	-13.150	12.578

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
6. ANALYSIS OF NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 206.895
Critical Value of Dunnett's T= 2.107

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

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6. ANALYSIS OF NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
6. ANALYSIS OF NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients
INTERCEPT	0
LEVEL CONTROL	L2
TRT1	L3
TRT2	L4
TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
6. ANALYSIS OF NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: NH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	276.01595	92.00532	0.44	0.7219
Error	66	13655.06977	206.89500		
Corrected Total	69	13931.08571			

R-Square	C.V.	Root MSE	NH Mean
0.019813	30.52969	14.384	47.114

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	276.01595	92.00532	0.44	0.7219

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
6. ANALYSIS OF NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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LEVEL   3   930.99207   310.33069   1.83   0.1497

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
7. ANALYSIS OF 14-DAY-OLD SURVIVORS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	HS LSMEAN	i/j	Pr > |T| HO: LSMEAN(i)=LSMEAN(j)			
			1	2	3	4
CONTROL	38.3684211	1		0.2391	0.0355	0.7768
TRT1	43.5294118	2	0.2391		0.3636	0.3921
TRT2	47.5555556	3	0.0355	0.3636		0.0807
TRT3	39.6250000	4	0.7768	0.3921	0.0807	

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
7. ANALYSIS OF 14-DAY-OLD SURVIVORS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: HS

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 169.3159
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - TRT1	-7.573	4.026	15.625
TRT2 - TRT3	-3.853	7.931	19.714
TRT2 - CONTROL	-2.094	9.187	20.468
TRT1 - TRT2	-15.625	-4.026	7.573
TRT1 - TRT3	-8.042	3.904	15.850
TRT1 - CONTROL	-6.289	5.161	16.611
TRT3 - TRT2	-19.714	-7.931	3.853
TRT3 - TRT1	-15.850	-3.904	8.042
TRT3 - CONTROL	-10.381	1.257	12.894
CONTROL - TRT2	-20.468	-9.187	2.094
CONTROL - TRT1	-16.611	-5.161	6.289
CONTROL - TRT3	-12.894	-1.257	10.381

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
7. ANALYSIS OF 14-DAY-OLD SURVIVORS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-5.329	4.637	14.604
TRT1 - CONTROL	-8.001	2.115	12.231
TRT3 - CONTROL	-10.568	-0.286	9.995

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
7. ANALYSIS OF 14-DAY-OLD SURVIVORS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
7. ANALYSIS OF 14-DAY-OLD SURVIVORS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
7. ANALYSIS OF 14-DAY-OLD SURVIVORS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: HS

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	930.99207	310.33069	1.83	0.1497
Error	66	11174.85079	169.31592		
Corrected Total	69	12105.84286			

R-Square	C.V.	Root MSE	HS Mean
0.076904	30.78236	13.012	42.271

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

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 169.3159
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	0.171	9.187	18.203
TRT1 - CONTROL	-3.990	5.161	14.312
TRT3 - CONTROL	-8.044	1.257	10.558

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
8. ANALYSIS OF EGGS SET/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
8. ANALYSIS OF EGGS SET/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients
INTERCEPT	0
LEVEL CONTROL	L2
TRT1	L3
TRT2	L4
TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
8. ANALYSIS OF EGGS SET/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	79.131437	26.377146	3.19	0.0294

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Error	66	546.583181	8.281563		
Corrected Total	69	625.714618			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.126466	3.971569	2.8778	72.459

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	79.131437	26.377146	3.19	0.0294

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
8. ANALYSIS OF EGGS SET/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	71.2434602	1		0.0035	0.1972	0.3926
TRT1	74.1532749	2	0.0035		0.0896	0.0429
TRT2	72.4765986	3	0.1972	0.0896		0.6924
TRT3	72.0837488	4	0.3926	0.0429	0.6924	

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
8. ANALYSIS OF EGGS SET/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 8.281563
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRT1 - TRT2	-0.8886	1.6767	4.2419	
TRT1 - TRT3	-0.5724	2.0695	4.7115	
TRT1 - CONTROL	0.3776	2.9098	5.4421	***
TRT2 - TRT1	-4.2419	-1.6767	0.8886	
TRT2 - TRT3	-2.2133	0.3928	2.9990	
TRT2 - CONTROL	-1.2617	1.2331	3.7280	
TRT3 - TRT1	-4.7115	-2.0695	0.5724	
TRT3 - TRT2	-2.9990	-0.3928	2.2133	
TRT3 - CONTROL	-1.7334	0.8403	3.4140	

9. ANALYSIS OF VIABLE EMBRYOS/EGGS SETS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	443.59039	147.86346	0.86	0.4684
Error	66	11400.42532	172.73372		
Corrected Total	69	11844.01571			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.037453	17.16585	13.143	76.564

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	443.59039	147.86346	0.86	0.4684

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
9. ANALYSIS OF VIABLE EMBRYOS/EGGS SETS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	74.5954077	1		0.5687	0.1855	0.8993
TRT1	77.1091125	2	0.5687		0.4645	0.5034
TRT2	80.3797085	3	0.1855	0.4645		0.1643
TRT3	74.0288254	4	0.8993	0.5034	0.1643	

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
9. ANALYSIS OF VIABLE EMBRYOS/EGGS SETS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 172.7337
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Difference Between Means	Simultaneous Lower Confidence Limit	Simultaneous Upper Confidence Limit
TRT2 - TRT1	3.271	-8.445	14.986

CONTROL - TRT1	-5.4421	-2.9098	-0.3776 ***
CONTROL - TRT2	-3.7280	-1.2331	1.2617
CONTROL - TRT3	-3.4140	-0.8403	1.7334

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
8. ANALYSIS OF EGGS SET/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 8.281563
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Difference Between Means	Simultaneous Lower Confidence Limit	Simultaneous Upper Confidence Limit
TRT1 - CONTROL	2.9098	0.8859	4.9337
TRT2 - CONTROL	1.2331	-0.7609	3.2272
TRT3 - CONTROL	0.8403	-1.2167	2.8973

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
9. ANALYSIS OF VIABLE EMBRYOS/EGGS SETS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
9. ANALYSIS OF VIABLE EMBRYOS/EGGS SETS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients
INTERCEPT	0
LEVEL CONTROL	L2
TRT1	L3
TRT2	L4
TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-5.610	5.784	17.178
TRT2 - TRT3	-5.551	6.351	18.253
TRT1 - TRT2	-14.986	-3.271	8.445
TRT1 - CONTROL	-9.051	2.514	14.078
TRT1 - TRT3	-8.986	3.080	15.146
CONTROL - TRT2	-17.178	-5.784	5.610
CONTROL - TRT1	-14.078	-2.514	9.051
CONTROL - TRT3	-11.187	0.567	12.321
TRT3 - TRT2	-18.253	-6.351	5.551
TRT3 - TRT1	-15.146	-3.080	8.986
TRT3 - CONTROL	-12.321	-0.567	11.187

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
9. ANALYSIS OF VIABLE EMBRYOS/EGGS SETS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 172.7337
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-3.322	5.784	14.891
TRT1 - CONTROL	-6.730	2.514	11.757
TRT3 - CONTROL	-9.961	-0.567	8.828

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
10. ANALYSIS OF LIVE 3-WEEK EMBRYOS/VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
10. ANALYSIS OF LIVE 3-WEEK EMBRYOS/VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients
INTERCEPT	0
LEVEL CONTROL	L2
TRT1	L3
TRT2	L4
TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
10. ANALYSIS OF LIVE 3-WEEK EMBRYOS/VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	74.121491	24.707164	0.96	0.4154
Error	66	1692.871274	25.649565		
Corrected Total	69	1766.992765			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.041948	5.831165	5.0645	86.853

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	74.121491	24.707164	0.96	0.4154

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	i/j	1	2	3	4
CONTROL	85.2876845	1	.	0.1742	0.3512	0.1320
TRT1	87.6103502	2	0.1742	.	0.6593	0.8664
TRT2	86.8518768	3	0.3512	0.6593	.	0.5459
TRT3	87.9082422	4	0.1320	0.8664	0.5459	.

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

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
10. ANALYSIS OF LIVE 3-WEEK EMBRYOS/VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
11. ANALYSIS OF NORMAL HATCHLINGS/3-WEEK LIVE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients
INTERCEPT	0
LEVEL	
CONTROL	L2
TRT1	L3
TRT2	L4
TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
11. ANALYSIS OF NORMAL HATCHLINGS/3-WEEK LIVE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	254.49719	84.83240	1.71	0.1726
Error	66	3266.50704	49.49253		
Corrected Total	69	3521.00424			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.072280	8.773429	7.0351	80.186

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	254.49719	84.83240	1.71	0.1726

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
11. ANALYSIS OF NORMAL HATCHLINGS/3-WEEK LIVE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	$Pr > |T|$ $H0: LSMEAN(i)=LSMEAN(j)$ i/j	1	2	3	4
CONTROL	82.1937376	1		0.6175	0.3802	0.0320
TRT1	81.0153771	2	0.6175		0.7171	0.1029
TRT2	80.1495549	3	0.3802	0.7171		0.1920
TRT3	76.9631289	4	0.0320	0.1029	0.1920	

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 25.64956
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT3 - TRT1	-4.352	0.298	4.947
TRT3 - TRT2	-3.530	1.056	5.643
TRT3 - CONTROL	-1.909	2.621	7.150
TRT1 - TRT3	-4.947	-0.298	4.352
TRT1 - TRT2	-3.756	0.758	5.273
TRT1 - CONTROL	-2.134	2.323	6.779
TRT2 - TRT3	-5.643	-1.056	3.530
TRT2 - TRT1	-5.273	-0.758	3.756
TRT2 - CONTROL	-2.826	1.564	5.955
CONTROL - TRT3	-7.150	-2.621	1.909
CONTROL - TRT1	-6.779	-2.323	2.134
CONTROL - TRT2	-5.955	-1.564	2.826

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
10. ANALYSIS OF LIVE 3-WEEK EMBRYOS/VIABLE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 25.64956
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT3 - CONTROL	-1.000	2.621	6.241
TRT1 - CONTROL	-1.239	2.323	5.885
TRT2 - CONTROL	-1.945	1.564	5.073

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
11. ANALYSIS OF NORMAL HATCHLINGS/3-WEEK LIVE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
12. ANALYSIS OF NORMAL HATCHLINGS/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
12. ANALYSIS OF NORMAL HATCHLINGS/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	235.25870	78.41957	0.75	0.5275
Error	66	6921.47337	104.87081		
Corrected Total	69	7156.73207			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.032872	16.19517	10.241	63.233

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	235.25870	78.41957	0.75	0.5275

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
12. ANALYSIS OF NORMAL HATCHLINGS/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
11. ANALYSIS OF NORMAL HATCHLINGS/3-WEEK LIVE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 49.49253
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
CONTROL - TRT1	-5.012	1.178	7.369
CONTROL - TRT2	-4.055	2.044	8.143
CONTROL - TRT3	-1.061	5.231	11.522
TRT1 - CONTROL	-7.369	-1.178	5.012
TRT1 - TRT2	-5.405	0.866	7.137
TRT1 - TRT3	-2.406	4.052	10.511
TRT2 - CONTROL	-8.143	-2.044	4.055
TRT2 - TRT1	-7.137	-0.866	5.405
TRT2 - TRT3	-3.185	3.186	9.557
TRT3 - CONTROL	-11.522	-5.231	1.061
TRT3 - TRT1	-10.511	-4.052	2.406
TRT3 - TRT2	-9.557	-3.186	3.185

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
11. ANALYSIS OF NORMAL HATCHLINGS/3-WEEK LIVE EMBRYOS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 49.49253
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRT1 - CONTROL	-6.126	-1.178	3.769	
TRT2 - CONTROL	-6.919	-2.044	2.830	
TRT3 - CONTROL	-10.259	-5.231	-0.202	***

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
12. ANALYSIS OF NORMAL HATCHLINGS/EGGS LAID
****
11:07 Wednesday, April 12, 2000

Comparison	Limit	Means	Limit
TRT2 - CONTROL	-4.028	3.068	10.163
TRT1 - CONTROL	-4.277	2.925	10.127
TRT3 - CONTROL	-8.551	-1.231	6.089

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
13. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
13. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
13. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	904.41549	301.47183	5.37	0.0023
Error	66	3704.59919	56.13029		
Corrected Total	69	4609.01469			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.196228	10.27609	7.4920	72.907

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	904.41549	301.47183	5.37	0.0023

	LSMEAN	i/j	1	2	3	4
CONTROL	62.0149387	1		0.3953	0.3658	0.7243
TRT1	64.9398726	2	0.3953		0.9673	0.2482
TRT2	65.0825283	3	0.3658	0.9673		0.2262
TRT3	60.7839276	4	0.7243	0.2482	0.2262	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
12. ANALYSIS OF NORMAL HATCHLINGS/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 104.8708
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - TRT1	-8.986	0.143	9.271
TRT2 - CONTROL	-5.810	3.068	11.946
TRT2 - TRT3	-4.975	4.299	13.573
TRT1 - TRT2	-9.271	-0.143	8.986
TRT1 - CONTROL	-6.086	2.925	11.936
TRT1 - TRT3	-5.246	4.156	13.557
CONTROL - TRT2	-11.946	-3.068	5.810
CONTROL - TRT1	-11.936	-2.925	6.086
CONTROL - TRT3	-7.927	1.231	10.389
TRT3 - TRT2	-13.573	-4.299	4.975
TRT3 - TRT1	-13.557	-4.156	5.246
TRT3 - CONTROL	-10.389	-1.231	7.927

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
12. ANALYSIS OF NORMAL HATCHLINGS/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 104.8708
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence	Difference Between	Simultaneous Upper Confidence

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CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
13. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	$Pr > |T|$ HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	68.7178234	1		0.0357	0.0003	0.4083
TRT1	74.0809589	2	0.0357		0.1207	0.2177
TRT2	78.0642991	3	0.0003	0.1207		0.0065
TRT3	70.8334702	4	0.4083	0.2177	0.0065	

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
13. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 56.13029
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRT2 - TRT1	-2.695	3.983	10.662	
TRT2 - TRT3	0.446	7.231	14.016	***
TRT2 - CONTROL	2.851	9.346	15.842	***
TRT1 - TRT2	-10.662	-3.983	2.695	
TRT1 - TRT3	-3.631	3.247	10.126	
TRT1 - CONTROL	-1.229	5.363	11.956	
TRT3 - TRT2	-14.016	-7.231	-0.446	***
TRT3 - TRT1	-10.126	-3.247	3.631	
TRT3 - CONTROL	-4.585	2.116	8.816	
CONTROL - TRT2	-15.842	-9.346	-2.851	***
CONTROL - TRT1	-11.956	-5.363	1.229	
CONTROL - TRT3	-8.816	-2.116	4.585	

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
13. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/NORMAL HATCHLINGS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

File:4499901.sas Page 34
NOTE: This tests controls the type I experimentwise error for
comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 56.13029
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRT2 - CONTROL	4.155	9.346	14.538	***
TRT1 - CONTROL	0.094	5.363	10.632	***
TRT3 - CONTROL	-3.240	2.116	7.471	

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
14. ANALYSIS OF EGGS NOT CRACKED/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this
analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
14. ANALYSIS OF EGGS NOT CRACKED/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
14. ANALYSIS OF EGGS NOT CRACKED/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	117.09836	39.03279	1.82	0.1517
Error	66	1414.08991	21.42560		

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Corrected Total   69   1531.18828

R-Square	C.V.	Root MSE	RESPONSE Mean
0.076475	5.346980	4.6288	86.568

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	117.09836	39.03279	1.82	0.1517

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
14. ANALYSIS OF EGGS NOT CRACKED/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	$Pr > |T|$ H_0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	85.3063709	1	.	0.0512	0.2048	0.9663
TRT1	88.3746837	2	0.0512	.	0.4774	0.0671
TRT2	87.2560150	3	0.2048	0.4774	.	0.2407
TRT3	85.3730745	4	0.9663	0.0671	0.2407	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
14. ANALYSIS OF EGGS NOT CRACKED/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 21.4256
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT1 - TRT2	-3.007	1.119	5.245
TRT1 - TRT3	-1.248	3.002	7.251
TRT1 - CONTROL	-1.005	3.068	7.141
TRT2 - TRT1	-5.245	-1.119	3.007
TRT2 - TRT3	-2.309	1.883	6.075
TRT2 - CONTROL	-2.063	1.950	5.962
TRT3 - TRT1	-7.251	-3.002	1.248
TRT3 - TRT2	-6.075	-1.883	2.309
TRT3 - CONTROL	-4.073	0.067	4.206
CONTROL - TRT1	-7.141	-3.068	1.005
CONTROL - TRT2	-5.962	-1.950	2.063
CONTROL - TRT3	-4.206	-0.067	4.073

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
14. ANALYSIS OF EGGS NOT CRACKED/EGGS LAID
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 21.4256
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT1 - CONTROL	-0.187	3.068	6.324
TRT2 - CONTROL	-1.258	1.950	5.157
TRT3 - CONTROL	-3.242	0.067	3.375

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
15. ANALYSIS OF NORMAL HATCHLINGS/EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
15. ANALYSIS OF NORMAL HATCHLINGS/EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
15. ANALYSIS OF NORMAL HATCHLINGS/EGGS SET
****
11:07 Wednesday, April 12, 2000

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT1 - TRT2	-13.334	-2.314	8.705
TRT1 - CONTROL	-10.057	0.821	11.698
TRT1 - TRT3	-7.358	3.991	15.341
CONTROL - TRT2	-13.852	-3.135	7.582
CONTROL - TRT1	-11.698	-0.821	10.057
CONTROL - TRT3	-7.885	3.171	14.227
TRT3 - TRT2	-17.501	-6.306	4.890
TRT3 - TRT1	-15.341	-3.991	7.358
TRT3 - CONTROL	-14.227	-3.171	7.885

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
15. ANALYSIS OF NORMAL HATCHLINGS/EGGS SET
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 152.8228
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-5.431	3.135	11.701
TRT1 - CONTROL	-7.874	0.821	9.515
TRT3 - CONTROL	-12.007	-3.171	5.666

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
16. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/EGGS SET
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
16. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/EGGS SET
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	343.68089	114.56030	0.75	0.5265
Error	66	10086.30171	152.82275		
Corrected Total	69	10429.98261			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.032951	17.48676	12.362	70.694

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	343.68089	114.56030	0.75	0.5265

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
15. ANALYSIS OF NORMAL HATCHLINGS/EGGS SET
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	i/j	1	2	3	4
CONTROL	70.4137430	1	.	0.8430	0.4435	0.4524
TRT1	71.2342708	2	0.8430	.	0.5818	0.3573
TRT2	73.5485136	3	0.4435	0.5818	.	0.1424
TRT3	67.2429320	4	0.4524	0.3573	0.1424	.

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

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
15. ANALYSIS OF NORMAL HATCHLINGS/EGGS SET
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 152.8228
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - TRT1	-8.705	2.314	13.334
TRT2 - CONTROL	-7.582	3.135	13.852
TRT2 - TRT3	-4.890	6.306	17.501

INTERCEPT   0

LEVEL		
CONTROL	L2
TRT1	L3
TRT2	L4
TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
16. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1065.8595	355.2865	2.96	0.0384
Error	66	7913.6916	119.9044		
Corrected Total	69	8979.5511			

R-Square	C.V.	Root MSE	RESPONSE Mean
0.118699	17.36699	10.950	63.051

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	1065.8595	355.2865	2.96	0.0384

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
16. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	RESPONSE LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	59.4485605	1	.	0.1442	0.0143	0.9632
TRT1	64.8510389	2	0.1442	.	0.3269	0.1486
TRT2	68.5092046	3	0.0143	0.3269	.	0.0168
TRT3	59.2765186	4	0.9632	0.1486	0.0168	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
16. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: RESPONSE

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 119.9044
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - TRT1	-6.103	3.658	13.419
TRT2 - CONTROL	-0.432	9.061	18.554
TRT2 - TRT3	-0.684	9.233	19.149
TRT1 - TRT2	-13.419	-3.658	6.103
TRT1 - CONTROL	-4.233	5.402	15.038
TRT1 - TRT3	-4.478	5.575	15.627
CONTROL - TRT2	-18.554	-9.061	0.432
CONTROL - TRT1	-15.038	-5.402	4.233
CONTROL - TRT3	-9.621	-0.172	9.965
TRT3 - TRT2	-19.149	-9.233	0.684
TRT3 - TRT1	-15.627	-5.575	4.478
TRT3 - CONTROL	-9.965	-0.172	9.621

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
16. ANALYSIS OF 14-DAY HATCHLING SURVIVORS/EGGS SET
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 119.9044
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	1.473	9.061	16.648
TRT1 - CONTROL	-2.299	5.402	13.104
TRT3 - CONTROL	-7.999	-0.172	7.655

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
17. ANALYSIS OF EGGSHELL THICKNESS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 69 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
17. ANALYSIS OF EGGSHELL THICKNESS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
17. ANALYSIS OF EGGSHELL THICKNESS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: THICK

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.0001234	0.0000411	0.89	0.4504
Error	65	0.0029997	0.0000461		
Corrected Total	68	0.0031232			

R-Square	C.V.	Root MSE	THICK Mean
0.039517	3.372005	0.0068	0.2015

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	0.0001234	0.0000411	0.89	0.4504

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
17. ANALYSIS OF EGGSHELL THICKNESS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	THICK LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	0.20136842	1	.	0.8058	0.4529	0.3757
TRT1	0.20193750	2	0.8058	.	0.6335	0.2785
TRT2	0.20305556	3	0.4529	0.6335	.	0.1136
TRT3	0.19931250	4	0.3757	0.2785	0.1136	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
17. ANALYSIS OF EGGSHELL THICKNESS
****

11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: THICK

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 65 MSE= 0.000046
Critical Value of Studentized Range= 3.729

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

LEVEL Comparison	Difference Between Means	Simultaneous Lower Confidence Limit	Simultaneous Upper Confidence Limit
TRT2 - TRT1	0.001118	-0.005037	0.007273
TRT2 - CONTROL	0.001687	-0.004205	0.007579
TRT2 - TRT3	0.003743	-0.002412	0.009898
TRT1 - TRT2	-0.001118	-0.007273	0.005037
TRT1 - CONTROL	0.000569	-0.005509	0.006647
TRT1 - TRT3	0.002625	-0.003708	0.008958
CONTROL - TRT2	-0.001687	-0.007579	0.004205
CONTROL - TRT1	-0.000569	-0.006647	0.005509
CONTROL - TRT3	0.002056	-0.004022	0.008134
TRT3 - TRT2	-0.003743	-0.009898	0.002412
TRT3 - TRT1	-0.002625	-0.008958	0.003708
TRT3 - CONTROL	-0.002056	-0.008134	0.004022

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
17. ANALYSIS OF EGGSHELL THICKNESS
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 65 MSE= 0.000046
Critical Value of Dunnett's T= 2.108

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

LEVEL Comparison	Difference Between Means	Simultaneous Lower Confidence Limit	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	0.001687	-0.003024	0.006398
TRT1 - CONTROL	0.000569	-0.004291	0.005429
TRT3 - CONTROL	-0.002056	-0.006916	0.002804

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
18. ANALYSIS OF HATCHLING WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

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Class   Levels   Values
LEVEL   4   CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
18. ANALYSIS OF HATCHLING WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect   Coefficients
INTERCEPT   0
LEVEL   CONTROL   L2
        TRT1   L3
        TRT2   L4
        TRT3   -L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
18. ANALYSIS OF HATCHLING WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: HATWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.0626344	0.0208781	0.09	0.9661
Error	66	15.5535584	0.2356600		
Corrected Total	69	15.6161928			

R-Square	C.V.	Root MSE	HATWT Mean
0.004011	6.469710	0.4854	7.5034

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	0.0626344	0.0208781	0.09	0.9661

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
18. ANALYSIS OF HATCHLING WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	HATWT LSMEAN	Pr > |T| HO: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
CONTROL	7.49142105	1	.	0.9113	0.9678	0.6971
TRT1	7.47329412	2	0.9113	.	0.8814	0.6272
TRT2	7.49788889	3	0.9678	0.8814	.	0.7295
TRT3	7.55581250	4	0.6971	0.6272	0.7295	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
18. ANALYSIS OF HATCHLING WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: HATWT

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 0.23566
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT3 - TRT2	-0.38170	0.05792	0.49755
TRT3 - CONTROL	-0.36976	0.06439	0.49854
TRT3 - TRT1	-0.36315	0.08252	0.52819
TRT2 - TRT3	-0.49755	-0.05792	0.38170
TRT2 - CONTROL	-0.41438	0.00647	0.42732
TRT2 - TRT1	-0.40813	0.02459	0.45732
CONTROL - TRT3	-0.49854	-0.06439	0.36976
CONTROL - TRT2	-0.42732	-0.00647	0.41438
CONTROL - TRT1	-0.40903	0.01813	0.44529
TRT1 - TRT3	-0.52819	-0.08252	0.36315
TRT1 - TRT2	-0.45732	-0.02459	0.40813
TRT1 - CONTROL	-0.44529	-0.01813	0.40903

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
18. ANALYSIS OF HATCHLING WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 0.23566
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT3 - CONTROL	-0.28260	0.06439	0.41139

TRT2 - CONTROL   -0.32990   0.00647   0.34284
TRT1 - CONTROL   -0.35954   -0.01813   0.32328

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
19. ANALYSIS OF 14-DAY SURVIVOR WEIGHT
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
19. ANALYSIS OF 14-DAY SURVIVOR WEIGHT
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect	Coefficients
INTERCEPT	0
LEVEL CONTROL	L2
TRT1	L3
TRT2	L4
TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
19. ANALYSIS OF 14-DAY SURVIVOR WEIGHT
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: SURVWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	48.510985	16.170328	3.26	0.0269
Error	66	327.346730	4.959799		
Corrected Total	69	375.857714			

R-Square	C.V.	Root MSE	SURVWT Mean
0.129067	8.079096	2.2271	27.566

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	48.510985	16.170328	3.26	0.0269

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE

19. ANALYSIS OF 14-DAY SURVIVOR WEIGHT
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

HO: LSMEAN(i)=LSMEAN(j)

LEVEL	SURVWT LSMEAN	Pr > |T| i/j	1	2	3	4
CONTROL	27.5842105	1	.	0.0841	0.1813	0.6420
TRT1	28.8882353	2	0.0841	.	0.0033	0.0364
TRT2	26.5944444	3	0.1813	0.0033	.	0.4083
TRT3	27.2312500	4	0.6420	0.0364	0.4083	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
19. ANALYSIS OF 14-DAY SURVIVOR WEIGHT
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: SURVWT

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05   Confidence= 0.95   df= 66   MSE= 4.959799
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRT1 - CONTROL	-0.6556	1.3040	3.2637	
TRT1 - TRT3	-0.3876	1.6570	3.7016	***
TRT1 - TRT2	0.3086	2.2938	4.2790	***
CONTROL - TRT1	-3.2637	-1.3040	0.6556	
CONTROL - TRT3	-1.6388	0.3530	2.3447	
CONTROL - TRT2	-0.9409	0.9898	2.9205	
TRT3 - TRT1	-3.7016	-1.6570	0.3876	
TRT3 - CONTROL	-2.3447	-0.3530	1.6388	
TRT3 - TRT2	-1.3800	0.6368	2.6537	
TRT2 - TRT1	-4.2790	-2.2938	-0.3086	***
TRT2 - CONTROL	-2.9205	-0.9898	0.9409	
TRT2 - TRT3	-2.6537	-0.6368	1.3800	

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
19. ANALYSIS OF 14-DAY SURVIVOR WEIGHT
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 4.959799
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT1 - CONTROL	-0.2622	1.3040	2.8703
TRT3 - CONTROL	-1.9449	-0.3530	1.2389
TRT2 - CONTROL	-2.5329	-0.9898	0.5534

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
20. ANALYSIS OF FOOD CONSUMPTION
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
20. ANALYSIS OF FOOD CONSUMPTION
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Type I Estimable Functions for: LEVEL

Effect		Coefficients
INTERCEPT		0
LEVEL	CONTROL	L2
	TRT1	L3
	TRT2	L4
	TRT3	-L2-L3-L4

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
20. ANALYSIS OF FOOD CONSUMPTION
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: FOOD

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	31.820685	10.606895	2.57	0.0615
Error	66	272.197029	4.124197		
Corrected Total	69	304.017714			

R-Square	C.V.	Root MSE	FOOD Mean

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE

R-Square	C.V.	Root MSE	FOOD Mean
0.104667	9.760838	2.0308	20.806

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	31.820685	10.606895	2.57	0.0615

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
20. ANALYSIS OF FOOD CONSUMPTION
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	FOOD LSMEAN		$\Pr > |T|$ H0: LSMEAN(i)=LSMEAN(j)			
		i/j	1	2	3	4
CONTROL	20.9315789	1	.	0.1586	0.2038	0.4815
TRT1	19.9647059	2	0.1586	.	0.0099	0.5006
TRT2	21.7888889	3	0.2038	0.0099	.	0.0582
TRT3	20.4437500	4	0.4815	0.5006	0.0582	.

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
20. ANALYSIS OF FOOD CONSUMPTION
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: FOOD

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 66 MSE= 4.124197
Critical Value of Studentized Range= 3.727

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
TRT2 - CONTROL	-0.9033	0.8573	2.6179	
TRT2 - TRT3	-0.4940	1.3451	3.1843	
TRT2 - TRT1	0.0139	1.8242	3.6344	***
CONTROL - TRT2	-2.6179	-0.8573	0.9033	
CONTROL - TRT3	-1.3284	-0.4878	2.3040	
CONTROL - TRT1	-0.8201	0.9669	2.7538	
TRT3 - TRT2	-3.1843	-1.3451	0.4940	
TRT3 - CONTROL	-2.3040	-0.4878	1.3284	
TRT3 - TRT1	-1.3854	0.4790	2.3435	
TRT1 - TRT2	-3.6344	-1.8242	-0.0139	***
TRT1 - CONTROL	-2.7538	-0.9669	0.8201	
TRT1 - TRT3	-2.3435	-0.4790	1.3854	

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE

20. ANALYSIS OF FOOD CONSUMPTION

11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05   Confidence= 0.95   df= 66   MSE= 4.124197

Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-0.5498	0.8573	2.2645
TRT3 - CONTROL	-1.9394	-0.4878	0.9638
TRT1 - CONTROL	-2.3951	-0.9669	0.4614

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
21. COVARIATE ANALYSIS OF MALE BODY WEIGHT

11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
21. COVARIATE ANALYSIS OF MALE BODY WEIGHT

11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: POSTM

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	19860.822	4965.206	17.14	0.0001
Error	65	18832.525	289.731		
Corrected Total	69	38693.347			

R-Square	C.V.	Root MSE	POSTM Mean
0.513288	7.234875	17.021	235.27

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

LEVEL	3	1305.446	435.149	1.50	0.2224
PREM	1	18555.376	18555.376	64.04	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	3	835.704	278.568	0.96	0.4164
PREM	1	18555.376	18555.376	64.04	0.0001

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
21. COVARIATE ANALYSIS OF MALE BODY WEIGHT

11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	POSTM LSMEAN	Std Err LSMEAN	Pr > $|T|$ HO:LSMEAN=0	LSMEAN Number
CONTROL	237.250589	3.906988	0.0001	1
TRT1	238.103480	4.128420	0.0001	2
TRT2	236.018557	4.021682	0.0001	3
TRT3	229.065351	4.259902	0.0001	4

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

i/j	1	2	3	4
1		0.8812	0.8270	0.1612
2	0.8812		0.7186	0.1325
3	0.8270	0.7186		0.2403
4	0.1612	0.1325	0.2403	

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
21. COVARIATE ANALYSIS OF MALE BODY WEIGHT

11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: POSTM

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05   Confidence= 0.95   df= 65   MSE= 289.7312

Critical Value of Studentized Range= 3.729

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT1 - TRT2	-15.094	0.085	15.264
TRT1 - CONTROL	-12.901	2.083	17.066
TRT1 - TRT3	-4.791	10.842	26.474
TRT2 - TRT1	-15.264	-0.085	15.094
TRT2 - CONTROL	-12.765	1.997	16.760
TRT2 - TRT3	-4.665	10.756	26.177
CONTROL - TRT1	-17.066	-2.083	12.901
CONTROL - TRT2	-16.760	-1.997	12.765

LEVEL Comparison	Lower	Difference	Upper
CONTROL - TRT3	-6.470	8.759	23.988
TRT3 - TRT1	-26.474	-10.842	4.791
TRT3 - TRT2	-26.177	-10.756	4.665
TRT3 - CONTROL	-23.988	-8.759	6.470

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
21. COVARIATE ANALYSIS OF MALE BODY WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 65 MSE= 289.7312
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT1 - CONTROL	-9.892	2.083	14.057
TRT2 - CONTROL	-9.800	1.997	13.795
TRT3 - CONTROL	-20.929	-8.759	3.411

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
22. COVARIATE ANALYSIS OF FEMALE BODY WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
LEVEL	4	CONTROL TRT1 TRT2 TRT3

Number of observations in data set = 76

NOTE: Due to missing values, only 70 observations can be used in this analysis.

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
22. COVARIATE ANALYSIS OF FEMALE BODY WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Dependent Variable: POSTF

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	24697.944	6174.486	19.10	0.0001
Error	65	21011.591	323.255		
Corrected Total	69	45709.535			

R-Square	C.V.	Root MSE	POSTF Mean
0.540324	6.827150	17.979	263.35

Source	DF	Type I SS	Mean Square	F Value	Pr > F
LEVEL	3	2073.424	691.141	2.14	0.1039
PREF	1	22624.520	22624.520	69.99	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	3	968.113	322.704	1.00	0.3994
PREF	1	22624.520	22624.520	69.99	0.0001

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
22. COVARIATE ANALYSIS OF FEMALE BODY WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure
Least Squares Means

LEVEL	POSTF LSMEAN	Std Err LSMEAN	Pr > |T| H0:LSMEAN=0	LSMEAN Number
CONTROL	266.962492	4.127426	0.0001	1
TRT1	260.353974	4.407947	0.0001	2
TRT2	266.651198	4.254502	0.0001	3
TRT3	258.529596	4.516041	0.0001	4

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

i/j	1	2	3	4
1		0.2766	0.9583	0.1736
2	0.2766		0.3109	0.7750
3	0.9583	0.3109		0.1933
4	0.1736	0.7750	0.1933	

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

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
22. COVARIATE ANALYSIS OF FEMALE BODY WEIGHT
****
11:07 Wednesday, April 12, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: POSTF

NOTE: This test controls the type I experimentwise error rate.

Alpha= 0.05 Confidence= 0.95 df= 65 MSE= 323.2553
Critical Value of Studentized Range= 3.729

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-11.503	4.090	19.683
TRT2 - TRT3	-8.671	7.618	23.907

	-1.192	14.841	30.874
TRT2 - TRT1			

	Lower	Diff	Upper
CONTROL - TRT2	-19.683	-4.090	11.503
CONTROL - TRT3	-12.557	3.528	19.614
CONTROL - TRT1	-5.076	10.751	26.578
TRT3 - TRT2	-23.907	-7.618	8.671
TRT3 - CONTROL	-19.614	-3.528	12.557
TRT3 - TRT1	-9.290	7.223	23.735
TRT1 - TRT2	-30.874	-14.841	1.192
TRT1 - CONTROL	-26.578	-10.751	5.076
TRT1 - TRT3	-23.735	-7.223	9.290

CGA-77102: REPRODUCTIVE STUDY WITH THE NORTHERN BOBWHITE
22. COVARIATE ANALYSIS OF FEMALE BODY WEIGHT
****

11:07 Wednesday, April 12, 2000

General Linear Models Procedure

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

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

Alpha= 0.05   Confidence= 0.95   df= 65   MSE= 323.2553
Critical Value of Dunnett's T= 2.107

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

LEVEL Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
TRT2 - CONTROL	-8.372	4.090	16.551
TRT3 - CONTROL	-16.383	-3.528	9.327
TRT1 - CONTROL	-23.399	-10.751	1.897

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

1. **CHEMICAL:** s-Metolachlor   PC Code No.: 108800

2. **TEST MATERIAL:** CGA-77102 technical   Purity: 98.6%

3. **CITATION:** Authors: W. Lima

     Title: S-Metolachlor (CGA-77102) - Life-Cycle Toxicity Test with Mysid (*Mysidopsis bahia*)

       Study Completion Date: November 30, 1999
       Laboratory: Springborn Laboratories, Inc., Wareham, MA
       Sponsor: Novartis Crop Protection, Inc., Greensboro, NC
       Laboratory Report ID: 1781.6575
       MRID No.: 449959-02   DP Barcode: D262736

4. **REVIEWED BY:** Mark Mossler, M.S., Environmental Toxicologist,
                     Golder Associates Inc.
   Signature: **Date:** May 2, 2000

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

5. **APPROVED BY:** Brian Montague, Fisheries Biologist
                     ERB I, Environmetal Fate and Effects Division
   Signature: **Date:** May 15, 2000

6. **STUDY PARAMETERS:**
     Age of Test Organism: $\leq$24 hours
     Definitive Test Duration: 28 days
     Study Method: Flow-Through
     Type of Concentrations: Mean Measured

7. **CONCLUSIONS:** This study is generally scientifically sound and fulfills the guideline requirements for a saltwater invertebrate life-cycle test. Raw data was incomplete , but sufficient to make an analysis.
     Results Synopsis: Most sensitive endpoint: Female growth and offspring/female
     NOEC: 130 ppb ai   LOEC: 250 ppb ai
     LOEC's for specific endpoints:
     Neonates Produced: 510 ppb ai   Mysid Survival: >510 ppb ai
     Length: 250 ppb ai   Dry weight: 250 ppb ai

8. **ADEQUACY OF THE STUDY:**
   A. Classification: Core
   B. Rationale: N/A
   C. Repairability: N/A

9. **GUIDELINE DEVIATIONS:** Since an EPA SEP for the mysid life cycle test does not exist, ASTM's Standard Guide for Conducting Life-Cycle Toxicity Tests With Saltwater Mysids (E1191-90) was used as a guidance in this evaluation. Significant deviations from the ASTM's guidelines were not noted. However, the test approaches minimum performance criteria for survival of adult controls with 73% mean survival in the control group. This was lower than most of the test groups which ranged from 73 to 90% mean survival.

   Details of mortality among adult mysids was omitted from the report, leaving no indication of when during the study the individual mortalies occurred. This information should normally be provided with the study report.

10. **SUBMISSION PURPOSE:** Study was submitted to support chronic estuarine invertebrate lifecycle testing requirements for the *s* isomer of metolachlor.

11. **MATERIALS AND METHODS:**

    A. Test Organisms/Acclimation

Guideline Criteria	Reported Information
Species *Mysidopsis* spp.	*Mysidopsis bahia*
Source Laboratory, commercial, or wild stock.	In-house culture
Parental Acclimation Conditions Parental stock must be maintained separately from the brood culture in dilution water and under test conditions.	Held under test conditions at 24 to 26°C
Parental Acclimation Period At least 14 days.	Continuous
Age of Parental Stock At least 10-12 days old at the beginning of the acclimation period.	Not reported
Food Brine shrimp nauplii in possible combination with rotifers and/or algae.	Mysids were fed live *Artemia salina* nauplii two times daily (intermittently supplemented w/ Selco®).

Guideline Criteria	Reported Information
Food Concentration 150 brine shrimp nauplii per mysid per day.	Not reported
Were mysids in good health during acclimation period?	It was reported that culture performance was excellent.

B. Test System

Guideline Criteria	Reported Information
Test Water Unpolluted saltwater that has been tested for contaminants, or appropriate reconstituted water.	Artificial seawater with a salinity of 25-28‰. The water was passed through a 10 μm filter and aerated for 24 hours prior to use.
Water Temperature 27 ±2°C.	23 - 27°C
pH	8.0 - 8.2
Dissolved Oxygen ≥60% throughout test.	>81% of saturation during the test
Test Vessels or Compartments 1. Material: Glass, No. 316 stainless steel, or perfluorocarbon plastics 2. Size: 250 mL with 200 mL fill volume is preferred; 100 mL with 80 mL fill volume is acceptable.	1. Glass 2. Each 19.5-L aquaria (39 x 20 x 25 cm) contained 2 retention chambers consisting of glass Petri dishes (10 cm diameter) with 15-cm high Nitex® screen collars.
Type of Dilution System Must provide reproducible supply of toxicant. Inter-mittent flow proportional diluters or continuous flow serial diluters should be used.	Intermittent-flow proportional diluter
Flow Rate At least 5 volume additions per 24 hours.	7.7 volume additions per 24 hours
Aeration Dilution water should be vigorously aerated, but the test tanks should not be aerated.	Dilution water was aerated prior to use.

Guideline Criteria	Reported Information
Photoperiod 16 hours light, 8 hours dark	16 hours light, 8 hours dark
Solvents Not to exceed 0.5 mL/L for static tests or 0.1 mL/L for flow-through tests. Acceptable solvents are dimethylforma-mide, triethylene glycol, methanol, acetone and ethanol.	Solvent: none Maximum conc.: N/A

C. Test Design

Guideline Criteria	Reported Information
Duration	28 days
Nominal Concentrations Control(s) and at least 5 test concentrations; dilution factor not less than 50%.	Dilution water control and six treatment concentrations: 19, 38, 75, 150, 300, and 600 μg active ingredient (ai)/L.
Number of Test Organisms 60 mysids/level; At least two test replicate vessels, each containing two chambers, with each chamber containing 15 mysids until 10 or 14 days after initiation. After sexing, at least 10 mated pairs per replicate.	60 mysids/level; 2 replicate vessels each containing 2 retention chambers with 15 mysids each for the first 14 days; 10 pairing jars with mated pairs and the remaining males and females separated in retention chambers from Day 14.
Test organisms randomly or impartially assigned to test vessels?	Impartially distributed
Renewal Parent mysids in all beakers must be transferred to containers with fresh test solution (< 4 hours old) three times each week (e.g. every Monday, Wednesday and Friday).	N/A

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Guideline Criteria	Reported Information
Water Parameter Measurements 1. Dissolved oxygen must be measured at each concentration at least once a week. 2. pH must be measured once a week in one test concentration and in one control. 3. Temperature should be monitored at least hourly throughout the test in one test chamber, and near the beginning, middle and end of the test in all test chambers.	1. Dissolved oxygen was measured daily in each vessel. 2. The pH was measured daily in each test vessel. 3. Temperature was measured daily in each vessel and continuously in one control vessel.
Chemical Analysis Needed if chemical was volatile, insoluble, or known to absorb, if precipitate formed, if containers were not steel or glass, or if flow-through system was used.	Samples removed on Days 0, 7, 14, 21, and 28 from alternating replicates and analyzed using HPLC.

12. REPORTED RESULTS:

A. General Results

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
Control Mortality ≤30% between pairing and test termination.	27% mortality in the control group
Did at least 75% of the paired female mysids in each control produce at least 3 young by test termination?	Yes
Percent Recovery of Chemical: 1) % of nominal; 2) Procedural recovery; 3) Limit of quantitation (LOQ)	1) 82 - 97% of nominal; 2) proc. recovery of 105%; 3) LOQ = 1.9 or 2.2 μg ai/L

Guideline Criteria	Reported Information
Data Endpoints - Survival of first-generation mysids, - Number of young produced per female, - Dry weight (required) and length (optional) of each first generation mysid alive at the end of the test, - Observations of other effects or clinical signs.	- Survival of parental mysids, - Number of offspring per female per reproductive day, - Dry weight and length of surviving first generation mysids by sex.
Raw data included?	Yes

Comments: No undissolved material was noted in the diluter.

Effects Data

Toxicant Concentration (µg ai/L)		Mean % Surv. (28 Days)	Mean # Young/ Female/ Repro. Day	Mean Length (mm)/ Mean Dry Weight (mg) By Sex	
Nom.	Mea.(RSD)			♂	♀
Con.	<2.2 (NA)	73	0.98	7.7/0.94	8.1/1.4
19	18 (13)	75	0.85	8.0/0.99	8.0/1.3
38	37 (4)	73	1.1	7.5/0.94	8.0/1.2
75	62 (4)	80	1.0	7.9/1.0	8.0/1.3
150	130 (5)	90	1.1	7.9/1.0	7.9/1.4
300	250 (7)	85	0.59	7.7/0.93	7.7/1.2
600	510 (6)	83	0.17	7.4/0.88	7.5/1.1

Toxicity Observations: No observations were reported.

B.   Statistical Results: The results were based on mean measured concentrations.

Endpoint	Method	NOEC (μg ai/L)	LOEC (μg ai/L)
Survival	Williams' test	510	NA
Reproduction	Williams' test	250	510
Length (♀)	Williams' test	130	250
Dry weight (♀)	Williams' test	250	510

13. VERIFICATION OF STATISTICAL RESULTS:

Endpoint	Method	NOEC (μg ai/L)	LOEC (μg ai/L)
Survival	Williams' test	510	NA
Reproduction	Williams' test	250	510
Length (♀)	Dunnett's test	130	250
Dry weight (♀)	Dunnett's test	130	250

14. **REVIEWER'S COMMENTS:** The daily pattern of mortality and young release was not provided. Future studies should include these data. This study is scientifically sound, fulfills the guideline requirements for a mysid life-cycle test, and can be classified as **Core**. Based on the most sensitive endpoint (female growth), the NOEC and LOEC are 130 and 250 ppb ai, respectively. The geometric mean MATC is 180 ppb ai.

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Mysid survival (Day 28)
File: mys   Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST   (Isotonic regression model)   TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Control	2	0.735	1.031	1.031
2	18 ppb ai	2	0.750	1.049	1.041
3	37 ppb ai	2	0.735	1.033	1.041
4	62 ppb ai	2	0.800	1.108	1.108
5	130 ppb ai	2	0.900	1.252	1.195
6	250 ppb ai	2	0.850	1.174	1.195
7	510 ppb ai	2	0.835	1.160	1.195

Mysid survival (Day 28)
File: mys   Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST   (Isotonic regression model)   TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Control	1.031				
18 ppb ai	1.041	0.125		1.89	k= 1, v= 7
37 ppb ai	1.041	0.125		2.00	k= 2, v= 7
62 ppb ai	1.108	0.950		2.04	k= 3, v= 7
130 ppb ai	1.195	2.022		2.06	k= 4, v= 7
250 ppb ai	1.195	2.022		2.07	k= 5, v= 7
510 ppb ai	1.195	2.022		2.08	k= 6, v= 7

s =   0.081
Note: df used for table values are approximate when v > 20.

Mysid reproduction
File: mys   Transform: NO TRANSFORMATION

WILLIAMS TEST   (Isotonic regression model)   TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Control	2	0.979	0.979	1.025
2	18 ppb ai	2	0.852	0.852	1.025
3	37 ppb ai	2	1.114	1.114	1.025
4	62 ppb ai	2	1.044	1.044	1.025
5	130 ppb ai	2	1.135	1.135	1.025
6	250 ppb ai	2	0.584	0.584	0.584
7	510 ppb ai	2	0.169	0.169	0.169

Mysid reproduction
File: mys   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
Control	1.025				
18 ppb ai	1.025	0.199		1.89	k= 1, v= 7
37 ppb ai	1.025	0.199		2.00	k= 2, v= 7
62 ppb ai	1.025	0.199		2.04	k= 3, v= 7
130 ppb ai	1.025	0.199		2.06	k= 4, v= 7
250 ppb ai	0.584	1.703		2.07	k= 5, v= 7
510 ppb ai	0.169	3.494	*	2.08	k= 6, v= 7

$s =$ 0.232
Note: df used for table values are approximate when $v > 20$.

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Male Analysis

s-metolachlor: Mysid Life Cycle
15:11 Tuesday, April 11, 2000

----- TRT=1 REP=1 ----- (con)

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	9	7.5666667	0.3122499	7.2000000	8.1000000
DWT	9	0.9488889	0.1226218	0.8000000	1.1700000

----- TRT=1 REP=2 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	10	7.8800000	0.3224903	7.2000000	8.2000000
DWT	10	0.9390000	0.1068176	0.6700000	1.0700000

----- TRT=2 REP=1 ----- (18 ppb ai)

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	10	8.1400000	0.2674987	7.7000000	8.5000000
DWT	10	0.9840000	0.0843538	0.8300000	1.1300000

----- TRT=2 REP=2 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	11	8.2727273	0.3068906	7.4000000	8.4000000
DWT	11	0.9972727	0.1266563	0.7800000	1.1900000

----- TRT=3 REP=1 ----- (37 ppb ai)

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	9	7.7000000	0.3391165	7.1000000	8.1000000
DWT	9	1.0133333	0.0957862	0.8900000	1.1300000

----- TRT=3 REP=2 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	6	7.3000000	1.1117554	5.3000000	8.1000000
DWT	6	0.8266667	0.3267211	0.2900000	1.1200000

----- TRT=4 REP=1 ----- (62 ppb ai)

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	10	8.0500000	0.2838231	7.6000000	8.6000000
DWT	10	1.0600000	0.0768838	0.9900000	1.2300000

s-metolachlor: Mysid Life Cycle
15:11 Tuesday, April 11, 2000

----- TRT=4 REP=2 -----

----- TRT=5 REP=1 ----- (130 ppb ai)

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	8	7.7250000	0.2659216	7.4000000	8.2000000
DWT	8	0.9262500	0.1169783	0.7000000	1.0500000

----- TRT=5 REP=2 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	11	7.9454545	0.4107643	7.5000000	8.6000000
DWT	11	1.0736364	0.1398766	0.9300000	1.3100000

----- TRT=6 REP=1 ----- (250 ppb ai)

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	18	7.9055556	0.3038425	7.3000000	8.4000000
DWT	18	1.0211111	0.1398272	0.6900000	1.2100000

----- TRT=6 REP=2 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	16	7.7437500	0.3463500	7.0000000	8.2000000
DWT	16	0.9068750	0.1026787	0.7400000	1.1200000

----- TRT=7 REP=1 ----- (510 ppb ai)

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	10	7.7300000	0.3653005	7.3000000	8.2000000
DWT	10	0.9760000	0.1326817	0.8100000	1.2100000

----- TRT=7 REP=2 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	8	7.4250000	0.4131759	6.6000000	8.0000000
DWT	8	0.8675000	0.1120905	0.6600000	1.0600000

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	16	7.4437500	0.2804015	7.0000000	8.1000000
DWT	16	0.8818750	0.1034227	0.7200000	1.0900000

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure
Class Level Information

Class   Levels   Values

Least Squares Means

TRT	LEN LSMEAN	LSMEAN Number
1	7.73157895	1
2	7.97619048	2
3	7.54000000	3
4	7.90555556	4
5	7.92068966	5
6	7.73846154	6
7	7.43750000	7

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

i/j	1	2	3	4	5	6	7
1		0.0507	0.1593	0.1794	0.1044	0.9537	0.0158
2	0.0507		0.0013	0.5758	0.6220	0.0405	0.0001
3	0.1593	0.0013		0.0085	0.0027	0.1207	0.4283
4	0.1794	0.5758	0.0085		0.8978	0.1667	0.0002
5	0.1044	0.6220	0.0027	0.8978		0.0874	0.0001
6	0.9537	0.0405	0.1207	0.1667	0.0874		0.0075
7	0.0158	0.0001	0.4283	0.0002	0.0001	0.0075	.

TRT	DWT LSMEAN	LSMEAN Number
1	0.94368421	1
2	0.99095238	2
3	0.93866667	3
4	1.00055556	4
5	1.04103448	5
6	0.93346154	6
7	0.87708333	7

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

i/j	1	2	3	4	5	6	7
1		0.2623	0.9130	0.1946	0.0141	0.7989	0.1043
2	0.2623		0.2456	0.8220	0.1898	0.1419	0.0047
3	0.9130	0.2456		0.1842	0.0165	0.9039	0.1606
4	0.1946	0.8220	0.1842		0.3109	0.1012	0.0033
5	0.0141	0.1898	0.0165	0.3109		0.0032	0.0001
6	0.7989	0.1419	0.9039	0.1012	0.0032		0.1355
7	0.1043	0.0047	0.1606	0.0033	0.0001	0.1355	

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
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: LEN

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= 145   MSE= 0.153724
Critical Value of T= 3.09254

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

Simultaneous Lower	Difference Between	Simultaneous Upper

TRT   7   1 2 3 4 5 6 7
REP   2   1 2

Number of observations in data set = 152

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

Dependent Variable: LEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	5.3605593	0.8934266	5.81	0.0001
Error	145	22.2899670	0.1537239		
Corrected Total	151	27.6505263			

R-Square	C.V.	Root MSE	LEN Mean
0.193868	5.053902	0.3921	7.7579

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	5.3605593	0.8934266	5.81	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	5.3605593	0.8934266	5.81	0.0001

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

Dependent Variable: DWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.4341954	0.0723659	4.11	0.0008
Error	145	2.5522441	0.0176017		
Corrected Total	151	2.9864395			

R-Square	C.V.	Root MSE	DWT Mean
0.145389	13.78027	0.1327	0.9628

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	0.4341954	0.0723659	4.11	0.0008

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	0.4341954	0.0723659	4.11	0.0008

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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
2 - 5	-0.2919	0.0555	0.4029	
2 - 4	-0.3188	0.0706	0.4601	
2 - 6	-0.1180	0.2377	0.5935	
2 - 1	-0.1393	0.2446	0.6285	
2 - 3	0.0263	0.4362	0.8461	***
2 - 7	0.1764	0.5387	0.9010	***
5 - 2	-0.4029	-0.0555	0.2919	
5 - 4	-0.3487	0.0151	0.3790	
5 - 6	-0.1452	0.1822	0.5097	
5 - 1	-0.1688	0.1891	0.5470	
5 - 3	-0.0049	0.3807	0.7663	
5 - 7	0.1486	0.4832	0.8178	***
4 - 2	-0.4601	-0.0706	0.3188	
4 - 5	-0.3790	-0.0151	0.3487	
4 - 6	-0.2047	0.1671	0.5389	
4 - 1	-0.2248	0.1740	0.5728	
4 - 3	-0.0583	0.3656	0.7895	
4 - 7	0.0900	0.4681	0.8461	***
6 - 2	-0.5935	-0.2377	0.1180	
6 - 5	-0.5097	-0.1822	0.1452	
6 - 4	-0.5389	-0.1671	0.2047	
6 - 1	-0.3591	0.0069	0.3728	
6 - 3	-0.1947	0.1985	0.5916	
6 - 7	-0.0423	0.3010	0.6442	
1 - 2	-0.6285	-0.2446	0.1393	
1 - 5	-0.5470	-0.1891	0.1688	
1 - 4	-0.5728	-0.1740	0.2248	
1 - 6	-0.3728	-0.0069	0.3591	
1 - 3	-0.2272	0.1916	0.6104	
1 - 7	-0.0783	0.2941	0.6664	
3 - 2	-0.8461	-0.4362	-0.0263	***
3 - 5	-0.7663	-0.3807	-0.0049	
3 - 4	-0.7895	-0.3656	0.0583	
3 - 6	-0.5916	-0.1985	0.1947	
3 - 1	-0.6104	-0.1916	0.2272	
3 - 7	-0.2966	0.1025	0.5016	
7 - 2	-0.9010	-0.5387	-0.1764	***
7 - 5	-0.8178	-0.4832	-0.1486	***
7 - 4	-0.8461	-0.4681	-0.0900	***
7 - 6	-0.6442	-0.3010	0.0423	
7 - 1	-0.6664	-0.2941	0.0783	

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
7 - 3	-0.5016	-0.1025	0.2966

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

Bonferroni (Dunn) T tests for variable: DWT

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= 145   MSE= 0.017602
Critical Value of T= 3.09254

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
5 - 4	-0.08263	0.04048	0.16359	
5 - 2	-0.06748	0.05008	0.16764	
5 - 1	-0.02375	0.09735	0.21845	
5 - 3	-0.02812	0.10237	0.23286	
5 - 6	-0.00324	0.10757	0.21839	
5 - 7	0.05073	0.16395	0.27717	***
4 - 5	-0.16359	-0.04048	0.08263	
4 - 2	-0.12219	0.00960	0.14139	
4 - 1	-0.07808	0.05687	0.19182	
4 - 3	-0.08155	0.06189	0.20533	
4 - 6	-0.05871	0.06709	0.19290	
4 - 7	-0.00446	0.12347	0.25140	
2 - 5	-0.16764	-0.05008	0.06748	
2 - 4	-0.14139	-0.00960	0.12219	
2 - 1	-0.08264	0.04727	0.17718	
2 - 3	-0.08642	0.05229	0.19099	
2 - 6	-0.06289	0.05749	0.17787	
2 - 7	-0.00873	0.11387	0.23647	
1 - 5	-0.21845	-0.09735	0.02375	
1 - 4	-0.19182	-0.05687	0.07808	
1 - 2	-0.17718	-0.04727	0.08264	
1 - 3	-0.13670	0.00502	0.14673	
1 - 6	-0.11361	0.01022	0.13406	
1 - 7	-0.05939	0.06660	0.19259	
3 - 5	-0.23286	-0.10237	0.02812	
3 - 4	-0.20533	-0.06189	0.08155	
3 - 2	-0.19099	-0.05229	0.08642	
3 - 1	-0.14673	-0.00502	0.13670	
3 - 6	-0.12783	0.00521	0.13824	
3 - 7	-0.07346	0.06158	0.19663	
6 - 5	-0.21839	-0.10757	0.00324	
6 - 4	-0.19290	-0.06709	0.05871	
6 - 2	-0.17787	-0.05749	0.06289	
6 - 1	-0.13406	-0.01022	0.11361	
6 - 3	-0.13824	-0.00521	0.12783	
6 - 7	-0.05976	0.05638	0.17252	
7 - 5	-0.27717	-0.16395	-0.05073	***
7 - 4	-0.25140	-0.12347	0.00446	
7 - 2	-0.23647	-0.11387	0.00873	
7 - 1	-0.19259	-0.06660	0.05939	
7 - 3	-0.19663	-0.06158	0.07346	

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

	Simultaneous Lower	Difference	Simultaneous Upper

REP	2	1 2
TRT	7	1 2 3 4 5 6 7

Number of observations in data set = 152

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

Dependent Variable: LEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	7.3972410	0.5690185	3.88	0.0001
Error	138	20.2532854	0.1467629		
Corrected Total	151	27.6505263			

R-Square	C.V.	Root MSE	LEN Mean
0.267526	4.938150	0.3831	7.7579

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.3557110	0.3557110	2.42	0.1218
TRT	6	5.3037238	0.8839540	6.02	0.0001
REP*TRT	6	1.7378061	0.2896344	1.97	0.0735

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.4114330	0.4114330	2.80	0.0963
TRT	6	5.3574642	0.8929107	6.08	0.0001
REP*TRT	6	1.7378061	0.2896344	1.97	0.0735

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	5.3574642	0.8929107	3.08	0.0982

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

Dependent Variable: DWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	0.6898717	0.0530671	3.19	0.0003
Error	138	2.2965677	0.0166418		
Corrected Total	151	2.9864395			

R-Square	C.V.	Root MSE	DWT Mean
0.231001	13.39925	0.1290	0.9628

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.0306453	0.0306453	1.84	0.1770

TRT Comparison	Confidence Limit	Between Means	Confidence Limit
7 - 6	-0.17252	-0.05638	0.05976

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

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

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

Alpha= 0.05   Confidence= 0.95   df= 145   MSE= 0.153724
Critical Value of Dunnett's T= 2.301

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
2 - 1	-0.0410	0.2446	0.5302	
5 - 1	-0.0771	0.1891	0.4554	
4 - 1	-0.1227	0.1740	0.4707	
6 - 1	-0.2654	0.0069	0.2792	
3 - 1	-0.5032	-0.1916	0.1200	
7 - 1	-0.5711	-0.2941	-0.0171	***

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

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

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

Alpha= 0.05   Confidence= 0.95   df= 145   MSE= 0.017602
Critical Value of Dunnett's T= 2.301

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
5 - 1	0.00725	0.09735	0.18745
4 - 1	-0.04353	0.05687	0.15728
2 - 1	-0.04938	0.04727	0.14392
3 - 1	-0.11045	-0.00502	0.10042
6 - 1	-0.10235	-0.01022	0.08191
7 - 1	-0.16034	-0.06660	0.02714

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

Class   Levels   Values

| TRT | 6 | 0.4368722 | 0.0728120 | 4.38 | 0.0004 |
| REP*TRT | 6 | 0.2223542 | 0.0370590 | 2.23 | 0.0441 |

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.0583968	0.0583968	3.51	0.0631
TRT	6	0.4378840	0.0729807	4.39	0.0004
REP*TRT	6	0.2223542	0.0370590	2.23	0.0441

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

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	0.4378840	0.0729807	1.97	0.2150

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

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

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= 0.289634
      Critical Value of Dunnett's T= 2.896

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
2 - 1	-0.2489	0.2446	0.7381
5 - 1	-0.2709	0.1891	0.6491
4 - 1	-0.3387	0.1740	0.6866
6 - 1	-0.4635	0.0069	0.4773
3 - 1	-0.7299	-0.1916	0.3468
7 - 1	-0.7727	-0.2941	0.1845

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

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

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= 0.037059
      Critical Value of Dunnett's T= 2.896

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
5 - 1	-0.06721	0.09735	0.26191
4 - 1	-0.12651	0.05687	0.24025
2 - 1	-0.12926	0.04727	0.22380
3 - 1	-0.19759	-0.00502	0.18755

| 6 | - 1 | -0.17849 | -0.01022 | 0.15805 |
| 7 | - 1 | -0.23781 | -0.06660 | 0.10461 |

female analysis

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--------------------------------- TRT=1 REP=1 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	14	7.9714286	0.3688414	7.2000000	8.4000000
DWT	14	1.4671429	0.2189987	1.1600000	1.8700000

--------------------------------- TRT=1 REP=2 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	11	8.1545455	0.4107643	7.5000000	8.7000000
DWT	11	1.3018182	0.2242239	1.0800000	1.9100000

--------------------------------- TRT=2 REP=1 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	11	8.0363636	0.3413875	7.4000000	8.6000000
DWT	11	1.2290909	0.1254157	0.9500000	1.4100000

--------------------------------- TRT=2 REP=2 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	13	7.8846154	0.3738229	7.1000000	8.7000000
DWT	13	1.3846154	0.1332676	1.1600000	1.6100000

--------------------------------- TRT=3 REP=1 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	15	8.0666667	0.3852599	7.1000000	8.8000000
DWT	15	1.3033333	0.2632399	0.6300000	1.7900000

--------------------------------- TRT=3 REP=2 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	14	7.8928571	0.3812213	7.2000000	8.5000000
DWT	14	1.0800000	0.1939865	0.7800000	1.5600000

--------------------------------- TRT=4 REP=1 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	15	7.9733333	0.2631313	7.5000000	8.4000000
DWT	15	1.3233333	0.2577836	0.9500000	1.8500000

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--------------------------------- TRT=4 REP=2 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	15	7.9400000	0.3501020	7.3000000	8.5000000
DWT	15	1.1753333	0.2025857	0.9200000	1.5900000

--------------------------------- TRT=5 REP=1 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	15	7.8733333	0.3127451	7.3000000	8.4000000
DWT	15	1.3380000	0.2429932	0.9900000	1.8800000

--------------------------------- TRT=5 REP=2 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	10	8.0600000	0.2875181	7.7000000	8.7000000
DWT	10	1.3710000	0.2118411	1.0000000	1.8100000

--------------------------------- TRT=6 REP=1 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	10	7.6800000	0.3852849	7.2000000	8.5000000
DWT	10	1.2320000	0.2252307	0.9800000	1.7300000

--------------------------------- TRT=6 REP=2 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	15	7.7866667	0.3398879	7.1000000	8.4000000
DWT	15	1.2100000	0.1853568	0.7900000	1.4100000

--------------------------------- TRT=7 REP=1 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	15	7.5866667	0.3113718	7.2000000	8.1000000
DWT	15	1.0953333	0.1790398	0.8300000	1.4700000

--------------------------------- TRT=7 REP=2 ---------------------------------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	11	7.4363636	0.3722169	6.9000000	8.0000000
DWT	11	1.0381818	0.2140943	0.7500000	1.4000000

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

Class   Levels   Values

TRT   7   1 2 3 4 5 6 7
REP   2   1 2

Number of observations in data set = 184

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

Dependent Variable: LEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	5.2436321	0.8739387	7.10	0.0001
Error	177	21.7871832	0.1230914		
Corrected Total	183	27.0308152			

R-Square	C.V.	Root MSE	LEN Mean
0.193987	4.451167	0.3508	7.8821

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	5.2436321	0.8739387	7.10	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	5.2436321	0.8739387	7.10	0.0001

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

Dependent Variable: DWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	1.8134963	0.3022494	6.37	0.0001
Error	177	8.4042466	0.0474816		
Corrected Total	183	10.2177429			

R-Square	C.V.	Root MSE	DWT Mean
0.177485	17.38460	0.2179	1.2534

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	1.8134963	0.3022494	6.37	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	1.8134963	0.3022494	6.37	0.0001

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

Least Squares Means

TRT	LEN LSMEAN	LSMEAN Number
1	8.05200000	1
2	7.95416667	2
3	7.98275862	3
4	7.95666667	4
5	7.94800000	5
6	7.74400000	6
7	7.52307692	7

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

i/j	1	2	3	4	5	6	7
1		0.3305	0.4705	0.3170	0.2961	0.0022	0.0001
2	0.3305		0.7681	0.9793	0.9510	0.0375	0.0001
3	0.4705	0.7681		0.7755	0.7170	0.0136	0.0001
4	0.3170	0.9793	0.7755		0.9274	0.0264	0.0001
5	0.2961	0.9510	0.7170	0.9274		0.0413	0.0001
6	0.0022	0.0375	0.0136	0.0264	0.0413		0.0258
7	0.0001	0.0001	0.0001	0.0001	0.0001	0.0258	.

TRT	DWT LSMEAN	LSMEAN Number
1	1.39440000	1
2	1.31333333	2
3	1.19551724	3
4	1.24933333	4
5	1.35120000	5
6	1.21880000	6
7	1.07115385	7

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

i/j	1	2	3	4	5	6	7
1		0.1947	0.0010	0.0149	0.4843	0.0049	0.0001
2	0.1947		0.0516	0.2850	0.5439	0.1308	0.0001
3	0.0010	0.0516		0.3442	0.0096	0.6959	0.0360
4	0.0149	0.2850	0.3442		0.0860	0.6055	0.0026
5	0.4843	0.5439	0.0096	0.0860		0.0331	0.0001
6	0.0049	0.1308	0.6959	0.6055	0.0331		0.0166
7	0.0001	0.0001	0.0360	0.0026	0.0001	0.0166	

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

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

Bonferroni (Dunn) T tests for variable: LEN

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= 177   MSE= 0.123091
Critical Value of T= 3.08256

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

Simultaneous Lower	Difference	Simultaneous Upper

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= 177   MSE= 0.047482
Critical Value of T= 3.08256

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
1 - 5	-0.14678	0.04320	0.23318	
1 - 2	-0.11089	0.08107	0.27302	
1 - 4	-0.03683	0.14507	0.32696	
1 - 6	-0.01438	0.17560	0.36558	***
1 - 3	0.01557	0.19888	0.38220	***
1 - 7	0.13510	0.32325	0.51140	***
5 - 1	-0.23318	-0.04320	0.14678	
5 - 2	-0.15409	0.03787	0.22982	
5 - 4	-0.08003	0.10187	0.28376	
5 - 6	-0.05758	0.13240	0.32238	
5 - 3	-0.02763	0.15568	0.33900	
5 - 7	0.09190	0.28005	0.46820	***
2 - 1	-0.27302	-0.08107	0.11089	
2 - 5	-0.22982	-0.03787	0.15409	
2 - 4	-0.11995	0.06400	0.24795	
2 - 6	-0.09742	0.09453	0.28649	
2 - 3	-0.06754	0.11782	0.30317	
2 - 7	0.05204	0.24218	0.43232	***
4 - 1	-0.32696	-0.14507	0.03683	
4 - 5	-0.28376	-0.10187	0.08003	
4 - 2	-0.24795	-0.06400	0.11995	
4 - 6	-0.15136	0.03053	0.21243	
4 - 3	-0.12110	0.05382	0.22874	
4 - 7	-0.00180	0.17818	0.35816	
6 - 1	-0.36558	-0.17560	0.01438	
6 - 5	-0.32238	-0.13240	0.05758	
6 - 2	-0.28649	-0.09453	0.09742	
6 - 4	-0.21243	-0.03053	0.15136	
6 - 3	-0.16003	0.02328	0.20660	
6 - 7	-0.04050	0.14765	0.33580	
3 - 1	-0.38220	-0.19888	-0.01557	***
3 - 5	-0.33900	-0.15568	0.02763	
3 - 2	-0.30317	-0.11782	0.06754	
3 - 4	-0.22874	-0.05382	0.12110	
3 - 6	-0.20660	-0.02328	0.16003	
3 - 7	-0.05705	0.12436	0.30578	
7 - 1	-0.51140	-0.32325	-0.13510	***
7 - 5	-0.46820	-0.28005	-0.09190	***
7 - 2	-0.43232	-0.24218	-0.05204	***
7 - 4	-0.35816	-0.17818	0.00180	
7 - 6	-0.33580	-0.14765	0.04050	

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

	Simultaneous Lower	Difference	Simultaneous Upper

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
1 - 3	-0.22592	0.06924	0.36440	
1 - 4	-0.19754	0.09533	0.38820	
1 - 2	-0.21123	0.09783	0.40690	
1 - 5	-0.20189	0.10400	0.40989	
1 - 6	0.00211	0.30800	0.61389	***
1 - 7	0.22599	0.52892	0.83186	***
3 - 1	-0.36440	-0.06924	0.22592	
3 - 4	-0.25555	0.02609	0.30773	
3 - 2	-0.26985	0.02859	0.32703	
3 - 5	-0.26040	0.03476	0.32992	
3 - 6	-0.05640	0.23876	0.53392	
3 - 7	0.16759	0.45968	0.75177	***
4 - 1	-0.38820	-0.09533	0.19754	
4 - 3	-0.30773	-0.02609	0.25555	
4 - 2	-0.29368	0.00250	0.29868	
4 - 5	-0.28420	0.00867	0.30154	
4 - 6	-0.08020	0.21267	0.50554	
4 - 7	0.14381	0.43359	0.72337	***
2 - 1	-0.40690	-0.09783	0.21123	
2 - 3	-0.32703	-0.02859	0.26985	
2 - 4	-0.29868	-0.00250	0.29368	
2 - 5	-0.30290	0.00617	0.31523	
2 - 6	-0.09890	0.21017	0.51923	
2 - 7	0.12495	0.43109	0.73723	***
5 - 1	-0.40989	-0.10400	0.20189	
5 - 3	-0.32992	-0.03476	0.26040	
5 - 4	-0.30154	-0.00867	0.28420	
5 - 2	-0.31523	-0.00617	0.30290	
5 - 6	-0.10189	0.20400	0.50989	
5 - 7	0.12199	0.42492	0.72786	***
6 - 1	-0.61389	-0.30800	-0.00211	***
6 - 3	-0.53392	-0.23876	0.05640	
6 - 4	-0.50554	-0.21267	0.08020	
6 - 2	-0.51923	-0.21017	0.09890	
6 - 5	-0.50989	-0.20400	0.10189	
6 - 7	-0.08201	0.22092	0.52386	
7 - 1	-0.83186	-0.52892	-0.22599	***
7 - 3	-0.75177	-0.45968	-0.16759	***
7 - 4	-0.72337	-0.43359	-0.14381	***
7 - 2	-0.73723	-0.43109	-0.12495	***
7 - 5	-0.72786	-0.42492	-0.12199	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
7 - 6	-0.52386	-0.22092	0.08201

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: DWT

REP	2	1 2
TRT	7	1 2 3 4 5 6 7

Number of observations in data set = 184

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

Dependent Variable: LEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	6.2351865	0.4796297	3.92	0.0001
Error	170	20.7956287	0.1223272		
Corrected Total	183	27.0308152			

R-Square	C.V.	Root MSE	LEN Mean
0.230670	4.437328	0.3498	7.8821

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.0055237	0.0055237	0.05	0.8320
TRT	6	5.2431761	0.8738627	7.14	0.0001
REP*TRT	6	0.9864867	0.1644145	1.34	0.2402

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.0009814	0.0009814	0.01	0.9287
TRT	6	5.5836070	0.9306012	7.61	0.0001
REP*TRT	6	0.9864867	0.1644145	1.34	0.2402

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	5.5836070	0.9306012	5.66	0.0267

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

Dependent Variable: DWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	2.6816126	0.2062779	4.65	0.0001
Error	170	7.5361303	0.0443302		
Corrected Total	183	10.2177429			

R-Square	C.V.	Root MSE	DWT Mean
0.262447	16.79778	0.2105	1.2534

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	1	0.2235047	0.2235047	5.04	0.0260

TRT Comparison	Lower Confidence Limit	Difference Between Means	Confidence Limit
7 - 3	-0.30578	-0.12436	0.05705

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 177 MSE= 0.123091
Critical Value of Dunnett's T= 2.304

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
3 - 1	-0.28990	-0.06924	0.15141	
4 - 1	-0.31428	-0.09533	0.12361	
2 - 1	-0.32889	-0.09783	0.13322	
5 - 1	-0.33268	-0.10400	0.12468	
6 - 1	-0.53668	-0.30800	-0.07932	***
7 - 1	-0.75540	-0.52892	-0.30245	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 177 MSE= 0.047482
Critical Value of Dunnett's T= 2.304

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
5 - 1	-0.18523	-0.04320	0.09883	
2 - 1	-0.22457	-0.08107	0.06244	
4 - 1	-0.28105	-0.14507	-0.00908	***
6 - 1	-0.31763	-0.17560	-0.03357	***
3 - 1	-0.33593	-0.19888	-0.06184	***
7 - 1	-0.46390	-0.32325	-0.18259	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure
Class Level Information

Class   Levels   Values

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	1.8047288	0.3007881	6.79	0.0001
REP*TRT	6	0.6533791	0.1088965	2.46	0.0265

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	1	0.1671133	0.1671133	3.77	0.0538
TRT	6	1.7557775	0.2926296	6.60	0.0001
REP*TRT	6	0.6533791	0.1088965	2.46	0.0265

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	1.7557775	0.2926296	2.69	0.1271

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

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

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= 0.164414
Critical Value of Dunnett's T= 2.910

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
3 - 1	-0.3913	-0.0692	0.2528	
4 - 1	-0.4149	-0.0953	0.2242	
2 - 1	-0.4350	-0.0978	0.2394	
5 - 1	-0.4377	-0.1040	0.2297	
6 - 1	-0.6417	-0.3080	0.0257	
7 - 1	-0.8594	-0.5289	-0.1984	***

ANALYSIS USING TRT*REP INTERACTION AS THE ERROR TERM
15:11 Tuesday, April 11, 2000

General Linear Models Procedure

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

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= 0.108897
Critical Value of Dunnett's T= 2.910

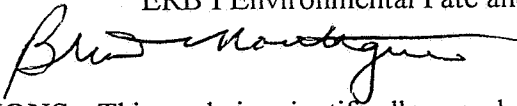Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
5 - 1	-0.31481	-0.04320	0.22841
2 - 1	-0.35549	-0.08107	0.19336
4 - 1	-0.40511	-0.14507	0.11498
6 - 1	-0.44721	-0.17560	0.09601

3 - 1	-0.46096	-0.19888	0.06319	
7 - 1	-0.59223	-0.32325	-0.05426	***

DATA EVALUATION RECORD
FRESHWATER FISH EARLY LIFE-STAGE TEST
GUIDELINE 72-4

1. **CHEMICAL:** s-Metolachlor   <u>PC Code No.</u>: 108800

2. **TEST MATERIAL:** CGA-77102 technical   <u>Purity</u>: 98.6%

3. **CITATION:** <u>Author</u>: J.V. Sousa
   <u>Title:</u> S-Metolachlor (CGA-77102): Early Life-Stage Toxicity Test with Fathead Minnow (*Pimephales promelas*)
   <u>Study Completion Date:</u> November 30, 1999
   <u>Laboratory:</u> Springborn Laboratories, Inc., Wareham, MA
   <u>Sponsor:</u> Novartis Crop Protection, Inc., Greensboro, NC
   <u>Laboratory Report ID:</u> 1781.6576
   <u>MRID No.:</u> 449959-03
   <u>DP Barcode:</u> D262736

4. **REVIEWED BY:**   Mark Mossler, M.S., Environmental Scientist,
                             Golder Associates Inc.

   Signature: **Date:** 5/2/00

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

   Signature: **Date:**

5. **APPROVED BY:**   Brian Montague, Fisheries Biologist
                             ERB I Environmental Fate and Effects Division
   Signature: **Date:** May 15, 2000

6. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements for a fish early life-stage toxicity test. The most sensitive parameter measured was dry weight of larval fish.

   NOEC: 30 ppb ai   **LOEC:** 56 ppb ai   **Growth effected :** 56 ppb

7. **ADEQUACY OF THE STUDY:**
   A.   **Classification:** Core
   B.   **Rationale:** N/A
   C.   **Repairability:** N/A

8.   **GUIDELINE DEVIATIONS:**

1. Only two replicates were utilized; four are recommended.

2. Laboratory has failed to provide sufficient raw data to determine how long D.O and pH variations occurred. The DO concentration fell below 75% of saturation in all groups at some time during the test and as low as 63% in in the 130 ppb test group. Controls fell to 67% saturation at one point. Mean average values for all test groups were above 75%, however. pH varies over one unit during the study. No explanations for either variance were offered.

9.   **MATERIALS AND METHODS:**

A.   **Biological System:**

Guideline Criteria	Reported Information
Species: A freshwater or saltwater fish species.	Fathead minnow (*Pimephales promelas*)
Source: Commercial fishery, wild, or brood stock.	In-house culture
Age at beginning of test: Embryos 2 to 24 hours old.	≤24 hours old
Replicates: Minimum of 20 embryos per replicate cup, 4 replicates per concentration. Minimum of 30 fish per treatment for posthatch exposure.	60 embryos/incubation cup, 1 cup/chamber, 2 replicate chambers/level (120 total embryos/level) Thinned to 40 fish/chamber, 2 replicate chambers/level
Posthatch: % of embryos that produce live fry must be ≥ 50% in each control; % hatch in any control embryo cup must be no more than 1.6 times that in another control cup.	85% control survival at hatch 1.1 times

Guideline Criteria	Reported Information
Feeding: Fish should be fed at least twice daily. Fish should not be fed for at least 24 hr prior to termination.	Fish were fed with live brine shrimp nauplii three times daily *ad libitum* beginning on Day 5 (Day 0 post-hatch). Food was withheld 24 hours before study termination.
Counts: At a minimum, live fish should be counted 11, 18, 25, and 32 days after hatching.	Embryos were counted daily and larvae were counted twice weekly.
Controls: Avg. survival at end of test must be $\geq$80%. Survival in any control chamber must not be <70%.	Terminal survival averaged 93% in the dilution water control group. Survival in each control replicate was $\geq$85%.

B. Physical System:

Guideline Criteria	Reported Information
Test Water: 1) May be natural (well or spring) or reconstituted water. 2) Water should be sterilized with UV radiation and screened for contaminants. 3) Hardness of 40-200 mg/L as $CaCO_3$, pH of 7.2-7.6	1) Aerated well water 2) The water was screened for contaminants. 3) Hardness of 38-44 mg/L as $CaCO_3$, pH of 6.7-7.8
Test Temperature: Depends upon test species; should not deviate by more than 2°C from appropriate temperature. For fathead minnow, 25°C is recommended.	24-27°C
Photoperiod: Recommend 16L/8D.	16-hour light/8-hour dark

Guideline Criteria	Reported Information
Dosing Apparatus: Intermittent flow proportional diluters or continuous flow serial diluters should be used. A minimum of 5 toxicant concentrations with a dilution factor not greater than 0.5 and controls should be used.	Intermittent-flow proportional diluter Control and six toxicant concentrations with a dilution factor of 0.5
Toxicant Mixing: 1) Mixing chamber is recommended but not required; 2) Aeration should not be used for mixing; 3) It must be demonstrated that the test solution is completely mixed before intro. into the test system; 4) Flow splitting accuracy must be within 10%.	1) Mixing chambers were used. 2) No aeration of exposure solutions. 3) Mixing confirmed by analysis. 4) Flow splitting accuracy verified prior to test initiation by chemical analysis.
Test Vessels: All glass or glass with stainless steel frame.	19.5-liter glass aquaria maintained with a test volume of approximately 15 liters
Embryo Cups: 120 mL glass jars with bottoms replaced with 40 mesh stainless steel or nylon screen.	Glass jars (50-mm diameter) with 40-mesh Nitex® screen bottoms (gently rocked until hatching was complete)
Flow Rate: Flow rates to larval cups should provide 90% replacement in 8-12 hours and must maintain DO $\geq$75% of saturation and maintain the toxicant level.	Approximately 6.6 volume additions/24 hours DO and chemical concentrations confirmed by analysis
Aeration: Dilution water should be aerated to insure DO concentration at or near 100% saturation. Test tanks and embryo cups should not be aerated.	DO was $\geq$63% of saturation throughout the duration of the test

C. **Chemical System:**

Guideline Criteria	Reported Information
Concentrations: Minimum of 5 concentrations and a control, all replicated, plus solvent control if appropriate. - Toxicant conc. must be measured in one tank at each toxicant level every week. - One concentration must adversely affect a life stage and one concentration must not affect any life stage.	- Negative control, 31, 63, 130, 250, 500, and 1000 μg ai/L. - Test solutions were analyzed on Days 0, 5, 7, 14, 21, 28, and test termination (Day 35). - The NOEC and LOEC were both determined.
Other Variables: DO must be measured at each conc. at least once a week.	DO was measured daily in each replicate.
Solvents: Should not exceed 0.1 mL/L in a flow-through system. Following solvents are acceptable: dimethylformamide, triethylene glycol, methanol, acetone, ethanol.	Solvent: none Conc.: N/A

Comments: Analytical results were obtained with solid-phase extraction coupled with HPLC-UV detection. The procedural recovery and highest LOQ were reported as 102% and 3.1 ppb ai, respectively. Mean measured concentrations ranged from 84 to 96% of nominal.

10. REPORTED RESULTS:

Guideline Criteria	Reported Information
Data Endpoints must include: - Number of embryos hatched; - Time to hatch; - Mortality of embryos, larvae, and juveniles; - Time to swim-up (if appropriate); - Measurement of growth; - Incidence of pathological or histological effects; - Observations of other effects or clinical signs.	Data include: - Number (survival) of embryos hatched; - 30-day post-hatch survival; - 30-day post-hatch length; - 30-day post-hatch wet and dry weight; - Clinical observations
Raw data included? (Y/N)	Yes

Effects Data

Toxicant Concentration (μg ai/L)		Mean % Hatch	30-day Post-hatch % Survival	Total Length (mm)	Wet Weight (mg)	Dry Weight (mg)
Nom.	Measured (RSD)					
Con.	<LOQ (N/A)	85	93	33.4	399	101
31	30 (9)	90	95	33.1	396	99.1
63	56 (9)	88	99	32.9	375	94.4
130	110 (7)	89	100	32.9	373	93.6
250	220 (4)	87	95	32.7	355	90.7
500	450 (4)	85	96	32.2	343	86.4
1000	870 (6)	85	98	31.6	334	83.4

Toxicity Observations: No sublethal signs of toxicity were reported.

Statistical Results: Percentage data were arcsine transformed prior to analyses. The MATC was reported to be 41 ppb ai.

Endpoint	Method	NOEC (μg ai/L)	LOEC (μg ai/L)
Survival @ Hatch	unspecified	870	N/A
Terminal Survival	unspecified	870	N/A
Length	Williams' test	110	220
Wet Weight	Williams' test	30	56
Dry Weight	Williams' test	30	56

11. **REVIEWER'S STATISTICAL RESULTS:** Since treatment survival means were equal to or greater than control means, these data were not analyzed. Growth data were analyzed as specified.

Endpoint	Method	NOEC (ppb ai)	LOEC (ppb ai)
Length	Dunnett's test	110	220
Wet Weight	"	56	110
Dry Weight	"	30	56

12. **REVIEWER'S COMMENTS:** This study is scientifically sound and fulfills the guideline requirements for a fish early life-stage toxicity test using the fathead minnow. Based on mean measured concentrations, the LOEC and NOEC for fathead minnows exposed to s-metolachlor were 56 and 30 ppb ai, respectively (geometric mean MATC = 41 ppb ai). This study is classified as **Core**.

File:A:\fhm2.sas Page 2
s-metolachlor: Fathead Minnow Early Life Stage
10:35 Tuesday, April 18, 2000

Analysis Variable : DRYWT

--- TRT=5 REP=1 --- (≈220 ppb ai)

N	Mean	Std Dev	Minimum	Maximum
40	0.0914550	0.0180726	0.0588000	0.1371000

--- TRT=5 REP=2 ---

N	Mean	Std Dev	Minimum	Maximum
36	0.0898222	0.0155769	0.0617000	0.1236000

--- TRT=6 REP=1 --- (≈450 ppb ai)

N	Mean	Std Dev	Minimum	Maximum
39	0.0873026	0.0189973	0.0356000	0.1213000

--- TRT=6 REP=2 ---

N	Mean	Std Dev	Minimum	Maximum
38	0.0854658	0.0151610	0.0577000	0.1336000

--- TRT=7 REP=1 --- (≈670 ppb ai)

N	Mean	Std Dev	Minimum	Maximum
38	0.0827947	0.0167391	0.0550000	0.1371000

--- TRT=7 REP=2 ---

N	Mean	Std Dev	Minimum	Maximum
39	0.0838923	0.0195815	0.0307000	0.1278000

s-metolachlor: Fathead Minnow Early Life Stage
10:35 Tuesday, April 18, 2000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRT	7	1 2 3 4 5 6 7
REP	2	1 2

Number of observations in data set = 539

File:A:\fhm2.sas Page 1
s-metolachlor: Fathead Minnow Early Life Stage
10:35 Tuesday, April 18, 2000

Analysis Variable : DRYWT

--- TRT=1 REP=1 --- (=Control)

N	Mean	Std Dev	Minimum	Maximum
34	0.1039941	0.0173017	0.0665000	0.1480000

--- TRT=1 REP=2 ---

N	Mean	Std Dev	Minimum	Maximum
40	0.0991800	0.0211390	0.0533000	0.1390000

--- TRT=2 REP=1 --- (≈30 ppb ai)

N	Mean	Std Dev	Minimum	Maximum
38	0.0983132	0.0237567	0.0397000	0.1424000

--- TRT=2 REP=2 ---

N	Mean	Std Dev	Minimum	Maximum
38	0.0998500	0.0150962	0.0690000	0.1310000

--- TRT=3 REP=1 --- (≈56 ppb ai)

N	Mean	Std Dev	Minimum	Maximum
40	0.0959450	0.0174793	0.0644000	0.1434000

--- TRT=3 REP=2 ---

N	Mean	Std Dev	Minimum	Maximum
39	0.0927205	0.0185146	0.0593000	0.1317000

--- TRT=4 REP=1 --- (≈110 ppb ai)

N	Mean	Std Dev	Minimum	Maximum
40	0.0927475	0.0180855	0.0497000	0.1254000

--- TRT=4 REP=2 ---

N	Mean	Std Dev	Minimum	Maximum
40	0.0945375	0.0174309	0.0620000	0.1314000

File:A:\fhm2.sas Page 4
s-metolachlor: Fathead Minnow Early Life Stage
10:35 Tuesday, April 18, 2000

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: DRYWT

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= 532   MSE= 0.00033
Critical Value of T= 3.05274

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
1 - 2	-0.006743	0.002310	0.011364	
1 - 3	-0.001930	0.007039	0.016007	
1 - 4	-0.001192	0.007749	0.016690	
1 - 5	0.001657	0.010710	0.019764	***
1 - 6	0.005971	0.014996	0.024020	***
1 - 7	0.009017	0.018041	0.027066	***
2 - 1	-0.011364	-0.002310	0.006743	
2 - 3	-0.004179	0.004728	0.013636	
2 - 4	-0.003441	0.005439	0.014319	
2 - 5	-0.000593	0.008400	0.017393	
2 - 6	0.003722	0.012685	0.021649	***
2 - 7	0.006767	0.015731	0.024695	***
3 - 1	-0.016007	-0.007039	0.001930	
3 - 2	-0.013636	-0.004728	0.004179	
3 - 4	-0.008082	0.000711	0.009504	
3 - 5	-0.005236	0.003672	0.012579	
3 - 6	-0.000921	0.007957	0.016835	***
3 - 7	0.002125	0.011003	0.019880	***
4 - 1	-0.016690	-0.007749	0.001192	
4 - 2	-0.014319	-0.005439	0.003441	
4 - 3	-0.009504	-0.000711	0.008082	
4 - 5	-0.005919	0.002961	0.011841	
4 - 6	-0.001604	0.007246	0.016097	***
4 - 7	0.001442	0.010292	0.019142	***
5 - 1	-0.019764	-0.010710	-0.001657	***
5 - 2	-0.017393	-0.008400	0.000593	
5 - 3	-0.012579	-0.003672	0.005236	
5 - 4	-0.011841	-0.002961	0.005919	
5 - 6	-0.004678	0.004285	0.013249	
5 - 7	-0.001633	0.007331	0.016295	
6 - 1	-0.024020	-0.014996	-0.005971	***
6 - 2	-0.021649	-0.012685	-0.003722	***
6 - 3	-0.016835	-0.007957	0.000921	
6 - 4	-0.016097	-0.007246	0.001604	
6 - 5	-0.013249	-0.004285	0.004678	
6 - 7	-0.005889	0.003045	0.011980	
7 - 1	-0.027066	-0.018041	-0.009017	***
7 - 2	-0.024695	-0.015731	-0.006767	***
7 - 3	-0.019880	-0.011003	-0.002125	***
7 - 4	-0.019142	-0.010292	-0.001442	***
7 - 5	-0.016295	-0.007331	0.001633	
7 - 6	-0.011980	-0.003045	0.005889	

General Linear Models Procedure

	Simultaneous Lower Confidence	Difference Between	Simultaneous Upper Confidence
TRT			

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General Linear Models Procedure

Dependent Variable: DRYWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.0190717	0.0031786	9.64	0.0001
Error	532	0.1754335	0.0003298		
Corrected Total	538	0.1945052			

R-Square	C.V.	Root MSE	DRYWT Mean
0.098052	19.59899	0.0182	0.0927

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	0.0190717	0.0031786	9.64	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	0.0190717	0.0031786	9.64	0.0001

General Linear Models Procedure
Least Squares Means

TRT	DRYWT LSMEAN	LSMEAN Number
1	0.10139189	1
2	0.09908158	2
3	0.09435316	3
4	0.09364250	4
5	0.09068158	5
6	0.08639610	6
7	0.08335065	7

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

i/j	1	2	3	4	5	6	7
1		0.4363	0.0169	0.0084	0.0003	0.0001	0.0001
2	0.4363		0.1057	0.0620	0.0045	0.0001	0.0001
3	0.0169	0.1057		0.8052	0.2088	0.0064	0.0002
4	0.0084	0.0620	0.8052		0.3092	0.0127	0.0004
5	0.0003	0.0045	0.2088	0.3092		0.1450	0.0128
6	0.0001	0.0001	0.0064	0.0127	0.1450		0.2985
7	0.0001	0.0001	0.0002	0.0004	0.0128	0.2985	

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

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: DRYWT

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Comparison	Limit	Means	Limit
7 - 6	-0.011980	-0.003045	0.005889

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General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 532 MSE= 0.00033
Critical Value of Dunnett's T= 2.294

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
2 - 1	-0.009113	-0.002310	0.004492	***
3 - 1	-0.013777	-0.007039	-0.000301	***
4 - 1	-0.014467	-0.007749	-0.001032	***
5 - 1	-0.017513	-0.010710	-0.003908	***
6 - 1	-0.021776	-0.014996	-0.008215	***
7 - 1	-0.024822	-0.018041	-0.011261	***

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--------- TRT=1 REP=1 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	34	33.7602941	1.5036329	30.7500000	36.9300000
WETWT	34	0.4059324	0.0697514	0.2589000	0.6105000

--------- TRT=1 REP=2 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	40	33.1587500	2.1802202	27.4700000	37.1200000
WETWT	40	0.3938950	0.0825637	0.2321000	0.5537000

--------- TRT=2 REP=1 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	38	32.9515789	2.2604610	24.8500000	38.0600000
WETWT	38	0.3930947	0.0933836	0.1704000	0.5581000

--------- TRT=2 REP=2 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	38	33.3326316	1.5384806	29.2100000	36.1100000
WETWT	38	0.3979079	0.0572332	0.2950000	0.5092000

--------- TRT=3 REP=1 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	40	33.0795000	1.6560580	30.0100000	37.3800000
WETWT	40	0.3861775	0.0707072	0.2784000	0.5892000

--------- TRT=3 REP=2 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	39	32.7710256	1.7650403	29.9400000	36.4200000
WETWT	39	0.3640179	0.0715672	0.2309000	0.5298000

--------- TRT=4 REP=1 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	40	32.7175000	1.5988710	28.8000000	36.1400000
WETWT	40	0.3664200	0.0689325	0.2057000	0.5268000

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--------- TRT=4 REP=2 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	40	33.0032500	1.6841560	29.2500000	36.2500000
WETWT	40	0.3792350	0.0699848	0.2512000	0.5204000

--------- TRT=5 REP=1 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	40	32.7687500	1.6389524	30.3100000	37.1600000
WETWT	40	0.3574850	0.0694876	0.2375000	0.5372000

--------- TRT=5 REP=2 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	36	32.5452778	1.6104382	29.7200000	35.4700000
WETWT	36	0.3523611	0.0585792	0.2336000	0.4783000

--------- TRT=6 REP=1 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	39	32.4005128	2.0322802	26.3700000	36.4700000
WETWT	39	0.3491436	0.0731162	0.1464000	0.4859000

--------- TRT=6 REP=2 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	38	32.0415789	1.6332320	27.8500000	35.2600000
WETWT	38	0.3363526	0.0599983	0.2178000	0.5200000

--------- TRT=7 REP=1 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	38	31.2518421	1.8904666	27.3200000	37.5100000
WETWT	38	0.3299158	0.0646102	0.2251000	0.5374000

--------- TRT=7 REP=2 ---------

Variable	N	Mean	Std Dev	Minimum	Maximum
LEN	40	31.9212500	2.2029900	24.8600000	35.5500000
WETWT	40	0.3377950	0.0772791	0.1238000	0.4919000

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General Linear Models Procedure
Class Level Information

Class   Levels   Values

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TRT   7   1 2 3 4 5 6 7
REP   2   1 2

Number of observations in data set = 540

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General Linear Models Procedure

Dependent Variable: LEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	173.70810	28.95135	8.72	0.0001
Error	533	1769.92622	3.32069		
Corrected Total	539	1943.63432			

R-Square	C.V.	Root MSE	LEN Mean
0.089373	5.574892	1.8223	32.687

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	173.70810	28.95135	8.72	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	173.70810	28.95135	8.72	0.0001

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General Linear Models Procedure

Dependent Variable: WETWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.2883937	0.0480656	9.53	0.0001
Error	533	2.6875007	0.0050422		
Corrected Total	539	2.9758944			

R-Square	C.V.	Root MSE	WETWT Mean
0.096910	19.31557	0.0710	0.3676

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	6	0.2883937	0.0480656	9.53	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	6	0.2883937	0.0480656	9.53	0.0001

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General Linear Models Procedure

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Least Squares Means

TRT	LEN LSMEAN	LSMEAN Number
1	33.4351351	1
2	33.1421053	2
3	32.9272152	3
4	32.8603750	4
5	32.6628947	5
6	32.2233766	6
7	31.5951282	7

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

i/j	1	2	3	4	5	6	7
1		0.3253	0.0855	0.0510	0.0097	0.0001	0.0001
2	0.3253		0.4633	0.3349	0.1056	0.0019	0.0001
3	0.0855	0.4633		0.8172	0.3671	0.0162	0.0001
4	0.0510	0.3349	0.8172		0.4990	0.0290	0.0001
5	0.0097	0.1056	0.3671	0.4990		0.1364	0.0003
6	0.0001	0.0019	0.0162	0.0290	0.1364		0.0323
7	0.0001	0.0001	0.0001	0.0001	0.0003	0.0323	

TRT	WETWT LSMEAN	LSMEAN Number
1	0.39942568	1
2	0.39550132	2
3	0.37523797	3
4	0.37282750	4
5	0.35505789	5
6	0.34283117	6
7	0.33395641	7

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

i/j	1	2	3	4	5	6	7
1		0.7352	0.0357	0.0206	0.0001	0.0001	0.0001
2	0.7352		0.0763	0.0467	0.0005	0.0001	0.0001
3	0.0357	0.0763		0.8306	0.0775	0.0045	0.0003
4	0.0206	0.0467	0.8306		0.1188	0.0084	0.0006
5	0.0001	0.0005	0.0775	0.1188		0.2874	0.0658
6	0.0001	0.0001	0.0045	0.0084	0.2874		0.4369
7	0.0001	0.0001	0.0003	0.0006	0.0658	0.4369	

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

s-metolachlor: Fathead Minnow Early Life Stage
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General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: LEN

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= 533 MSE= 3.320687
Critical Value of T= 3.05272

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

Simultaneous   Simultaneous
Lower   Difference   Upper

TRT Comparison	Lower Confidence Limit	Difference Between Means	Confidence Limit	
1 - 2	-0.6155	0.2930	1.2015	
1 - 3	-0.3920	0.5079	1.4079	
1 - 4	-0.3225	0.5748	1.4720	
1 - 5	-0.1363	0.7722	1.6807	
1 - 6	0.3062	1.2118	2.1173	***
1 - 7	0.9373	1.8400	2.7427	***
2 - 1	-1.2015	-0.2930	0.6155	
2 - 3	-0.6789	0.2149	1.1087	
2 - 4	-0.6093	0.2817	1.1728	
2 - 5	-0.4232	0.4792	1.3816	
2 - 6	0.0192	0.9187	1.8182	***
2 - 7	0.6504	1.5470	2.4436	***
3 - 1	-1.4079	-0.5079	0.3920	
3 - 2	-1.1087	-0.2149	0.6789	
3 - 4	-0.8155	0.0668	0.9492	
3 - 5	-0.6295	0.2643	1.1581	
3 - 6	-0.1870	0.7038	1.5947	
3 - 7	0.4441	1.3321	2.2200	***
4 - 1	-1.4720	-0.5748	0.3225	
4 - 2	-1.1728	-0.2817	0.6093	
4 - 3	-0.9492	-0.0668	0.8155	
4 - 5	-0.6936	0.1975	1.0885	
4 - 6	-0.2511	0.6370	1.5251	
4 - 7	0.3801	1.2652	2.1504	***
5 - 1	-1.6807	-0.7722	0.1363	
5 - 2	-1.3816	-0.4792	0.4232	
5 - 3	-1.1581	-0.2643	0.6295	
5 - 4	-1.0885	-0.1975	0.6936	
5 - 6	-0.4600	0.4395	1.3390	
5 - 7	0.1712	1.0678	1.9644	***
6 - 1	-2.1173	-1.2118	-0.3062	***
6 - 2	-1.8182	-0.9187	-0.0192	***
6 - 3	-1.5947	-0.7038	0.1870	
6 - 4	-1.5251	-0.6370	0.2511	
6 - 5	-1.3390	-0.4395	0.4600	
6 - 7	-0.2654	0.6282	1.5219	
7 - 1	-2.7427	-1.8400	-0.9373	***
7 - 2	-2.4436	-1.5470	-0.6504	***
7 - 3	-2.2200	-1.3321	-0.4441	***
7 - 4	-2.1504	-1.2652	-0.3801	***
7 - 5	-1.9644	-1.0678	-0.1712	***

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General Linear Models Procedure

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
7 - 6	-1.5219	-0.6282	0.2654	

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: WETWT

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= 533   MSE= 0.005272
Critical Value of T= 3.05272

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
1 - 2	-0.03148	0.00392	0.03933	
1 - 3	-0.01088	0.02419	0.05926	
1 - 4	-0.00836	0.02660	0.06156	
1 - 5	-0.00897	0.04437	0.07977	***
1 - 6	0.02131	0.05659	0.09188	***
1 - 7	0.03029	0.06547	0.10065	***
2 - 1	-0.03933	-0.00392	0.03148	
2 - 3	-0.01457	0.02026	0.05509	
2 - 4	-0.01205	0.02267	0.05740	
2 - 5	0.00528	0.04044	0.07561	***
2 - 6	0.01762	0.05267	0.08772	***
2 - 7	0.02661	0.06154	0.09648	***
3 - 1	-0.05926	-0.02419	0.01088	
3 - 2	-0.05509	-0.02026	0.01457	
3 - 4	-0.03197	0.00241	0.03679	
3 - 5	-0.01465	0.02018	0.05501	
3 - 6	-0.00231	0.03241	0.06712	
3 - 7	0.00668	0.04128	0.07588	***
4 - 1	-0.06156	-0.02660	0.00836	
4 - 2	-0.05740	-0.02267	0.01205	
4 - 3	-0.03679	-0.00241	0.03197	
4 - 5	-0.01695	0.01777	0.05249	
4 - 6	-0.00461	0.03000	0.06460	
4 - 7	0.00438	0.03887	0.07336	***
5 - 1	-0.07977	-0.04437	-0.00897	***
5 - 2	-0.07561	-0.04044	-0.00528	***
5 - 3	-0.05501	-0.02018	0.01465	
5 - 4	-0.05249	-0.01777	0.01695	
5 - 6	-0.02282	0.01223	0.04728	
5 - 7	-0.01384	0.02110	0.05604	
6 - 1	-0.09188	-0.05659	-0.02131	***
6 - 2	-0.08772	-0.05267	-0.01762	***
6 - 3	-0.06712	-0.03241	0.00231	
6 - 4	-0.06460	-0.03000	0.00461	
6 - 5	-0.04728	-0.01223	0.02282	
6 - 7	-0.02595	0.00887	0.04370	
7 - 1	-0.10065	-0.06547	-0.03029	***
7 - 2	-0.09648	-0.06154	-0.02661	***
7 - 3	-0.07588	-0.04128	-0.00668	***
7 - 4	-0.07336	-0.03887	-0.00438	***
7 - 5	-0.05604	-0.02110	0.01384	

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General Linear Models Procedure

Simultaneous Lower   Difference   Simultaneous Upper

TRT Comparison	Confidence Limit	Between Means	Confidence Limit
7 - 6	-0.04370	-0.00887	0.02595

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General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 533 MSE= 2.293
Critical Value of Dunnett's T= 3.320687

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
2 - 1	-0.9756	-0.2930	0.3895	
3 - 1	-1.1840	-0.5079	0.1682	
4 - 1	-1.2488	-0.5748	0.0993	
5 - 1	-1.4548	-0.7722	-0.0897	***
6 - 1	-1.8921	-1.2118	-0.5314	***
7 - 1	-2.5182	-1.8400	-1.1618	***

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General Linear Models Procedure

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

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

Alpha= 0.05 Confidence= 0.95 df= 533 MSE= 0.005042
Critical Value of Dunnett's T= 2.293

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

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
2 - 1	-0.03052	-0.00392	0.02267	
3 - 1	-0.05053	-0.02419	0.00216	
4 - 1	-0.05286	-0.02660	-0.00033	***
5 - 1	-0.07096	-0.04437	-0.01777	***
6 - 1	-0.08311	-0.05659	-0.03008	***
7 - 1	-0.09190	-0.06547	-0.03904	***