DATA EVALUATION RECORD

1. Chemical: PP 321 (Lambda Cyhalothrin)

2. Test Material: ^{14}C[phenyl] lambda* cyhalothrin (PP321)
    98.5% w/w IUPAC Chemical name:

    (R)- a -cyano-3-phenoxybenzyl (1S)-cis-3-
    [Z-2-chloro-3,3,3-trifluoroprop-1-enyl]-2,2-
    dimethylcyclopropanecarboxylate

    (S)- a -cyano-3-phenoxybenzyl (1R)-cis-3-
    [Z-2-chloro-3,3,3-trifluoroprop-1-enyl]-2,3-
    dimethylcyclopropanecarboxylate

    Lambda cyhalothrin is the racemic mixture
    containing the above two isomers in a 1:1
    ratio

and isomer
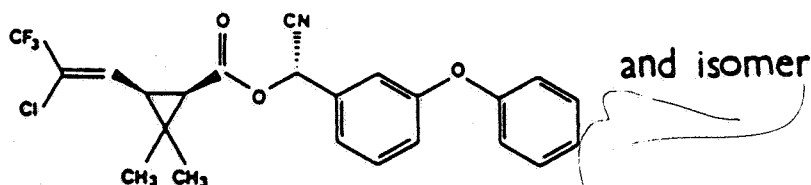
3. Study Type: Mysid Life-Cycle Toxicity Testing - Flow Through

    Species Tested: Mysid Shrimp
                     (Mysidopsis bahia)

4. Study Title: Thompson, R.S. (1987) PP 321 (Lambda Cyhalothrin)
                  Determination of Chronic Toxicity to mysid
                  shrimps (Mysidopsis bahia). Prepared by:
                  ICI PLC Brixham Laboratory. Submitted by ICI
                  America, Inc. EPA Accession No. unknown.

5. Reviewed By: Candy Brassard   Signature: _Candy Brassard_

                  EEB/HED   Date: 3-16-88

6. Approved By: Douglas J. Urban   Signature: _Douglas J. Urban_
                  Head-Section III
                  EEB/HED   Date: 3/21/88

*It should be noted Lambda cyhalothrin is PP321 or Karate. It
is not cyhalothrin. Confirmed with Jim Wagner, ICI, March 3,
1988.

7. Conclusion:

The study appears to be scientifically sound. However, based on the incomplete raw data, the reproductive success can not be calculated. Therefore the study is classified as "supplemental." The current data indicate that reproduction may be affected at 0.46 ng/L and the NOEL = 0.22 ng/L. Survival and dry weights were determined to have a NOEL = 1.7 ng/L and a LOEL = 3.7 ng/L (measured concentration).

8. Recommendations:

The study author should submit raw data with regards to number of females and males per test chamber per replicate on a daily basis from test initiation to test termination. The study author must also clarify the data discrepencies with regards to the measured concentration concerns. See Section 14 A.

9. Background:

This study was submitted to support registration of PP 321 for use on cotton and soybeans.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:

a. Test Organisms - The mysid shrimp were < 24 hours old derived from continuous cultures at the Brixham Laboratory. No symptoms of disease had been observed.

The mysids had been fed Artemia nauphii at a rate of 1820 to 4550 nauplii per chamber per day.

b. Test System (excerpted from submission) - Rectangular tanks (71 cm x 28.5 cm x 7 cm working depth) constructed of glass and silcone rubber sealant divided length ways to provide two replicates, each of 7.5 liters working volume, were employed. Each replicate vessel contained four retention chambers, constructed from glass beakers of 100 mm diameter and 500 mL working volume, with a window cut in the side which was covered by nylon mesh. Each chamber had a loose fitting lid.

The test vessels drained automatically to approximately one-half of working volume (4.5 cm reduction in working depth) every 45 minutes, to ensure exchange of test solution between vessel and retention chambers. No aeration was used in the exposure vessels.

Dilution water flows of 500 mL/minute (720 l/day) for
each control and test concentration were obtained by use
of fixed aperture outlets from a constant head tank.
The stock solutions of the test substance in triethylene
glycol were delivered by syringe pump to mix with the
dilution water in chambers of approximately 0.5 litres
working volume, stirred by magnetic follower. The flow
rate of the stock solutions was 0.00183 mL/minute. The
solvent control received triethylene glycol delivered in
the same manner. The test solution flow was divided
equally between the duplicate vessels. All flow rates
were checked daily.

The loading factors were 0.38 litres (tank volume)/mysid
and 18 litres/day (flow)/mysid.

Temperature of dilution water was maintained at 25 +/- 1 C.
The photoperiod was controlled to provide 14 hours light
10 hours dark with gradual transition periods of 15 minutes.

Physical and Chemical Analysis

Physical (excerpted from submission) - "The dissolved
oxygen, pH and temperature of each test solution were
measured three times during the first week and twice
per week thereafter, alternating between the duplicate
tanks. The salinity of the control (dilution water)
was measured daily. In addition, the temperature of
the solvent control was measured daily by thermometer
and monitored hourly using an electronic recording
system (platinum resistance sensor)." The following
ranges were reported.

pH values	7.90 to 8.20
Dissolved oxygen	6.35 to 7.55 mg/L
Temperature	24.6 to 25.7 C
Salinity	19.1 to 20.8 /oo

Chemical (excerpted from submission) - "Each test
solution was sampled five times in the first week and
twice per week thereafter for determination of the
concentration of the test substance (as ^{14}C activity).

Samples from the highest concentration tested (0.01 ug/L
nominal) were also analysed for lambda cyhalothrin by
gas chromatography. However, with one exception or
which contamination was suspected, the concentrations
proved to be below the detection limit of the method
(0.01 ug/L).

Once per week the stock solutions used for the nominal
0.00065 and 0.01 ug/L concentrations were analysed by
radiochemistry and gas chromatography, at the start and

finish of the 3 or 4 day interval between refilling the syringe pumps. The radiochemical and specific analytical methods are given in Appendix 1."

Radiochemical Analysis - For each concentration the measured concentrations were relatively constant, with two exception day 8 a low value (0.00087 ug/L) was recorded for the nominal 0.010 ug/L test solution. On day 13 a sample from nominal 0.00065 ug/L test solution was below detection limit but it was not apparent until day 15 when a leak was detected in the dosing line. The study author reported that this nominal concentration was not receiving the correct quantity of stock solution for the 3-day period following renewal of the stock solutions on day 12.

Both these low values were included in the calculation of the means and standard deviations given in Table 7.

Mean measured concentrations ranged from 48 to 74 percent of the nominal value.

c. Dose - The six treatment levels included the following nominal doses: 0.00033, 0.0065, 0.0013, 0.0025, 0.005 and 0.01 ug/L. There were also a control and a solvent control. The solvent control and each treatment level received 0.0037 mL triethylene gycol/litre.

d. Study Design - Forty mysids were randomly assigned to each control and dose, with five per chamber, and four retention chambers per replicate. Two replicates per treatment level were used.

Prior to test initiation, the test solutions had been running through test vessels for > 24 hours. The study duration was 28 days.

Mysid Observations

Mortalities (excerpted from submission) - "Mortalities of the mysids in each retention chamber were assessed daily. Mortality was defined as absence of signs of life when viewed by eye, if necessary after removal of the retention chamber, with residual test solution, to an illuminated viewing area. Dead animals found on the sides or lid of the retention chambers, above the maximum water level of the system, were recorded separately, since these must have jumped from the test solution. From Day 14 the sex of dead mysids were recorded."

Mysid Pairing (excerpted from submission) – "After 14 days, the sex of each mysid was determined, and the animals were redistributed, if necessary within the replicate vessel, in order to minimize the number of chambers with extreme sex ratios. Females from chambers found to contain no males were not redistributed and were retained for growth and survival measurements only. Any excess males were retained and used to replace subsequent male mortalities in the paired chambers. Offspring were counted and removed daily from each retention chamber."

Growth Measurement (excerpted from submission) – At the end of the test, the dry weights of the surviving mysids were determined. The mysids were killed with formaldehyde, rinsed briefly in distilled water and dried for 42 hours at 105 C. Dry weights (to 0.01 mg) of individuals were determined and recorded separately for males and females.

12. Reported Results:

Mortality – The test substance caused significant mortality of the mysids at > 0.0037 ug/L (measured concentration). There was no effect on survival < 0.0017 ug/L (measured concentration). See Table 1 and Appendix 4.

Growth (Dry Weights)

There was no-effect on the weight of male or female mysids at 0.0007 ug/L (measured concentrations).

The female dry weight was significantly lower than pooled controls at > 0.0017 ug/L (measured concentrations).

Male dry weight was significantly lower than the pooled controls > 0.0037 ug/L (measured concentrations).

Reproduction (excerpted from submission) – The raw data for reproduction are given in Appendix 5. No offspring were produced at the highest nominal concentration tested (0.010 ug/L). Only one young mysid was produced at the next highest nominal concentration (0.005 ug/L). Therefore it was not considered necessary to include these concentrations in the statistical analyses as described below.

The day on which offspring were first observed is given in Table 5. First release of offspring in the control and solvent control was observed on day 16 and 17, respectively. With the exception of the two highest concentrations tested (see above), offspring were first observed on day 17 and 18 in the test substance concentrations, and no concentration related delay in the onset of reproduction was apparent.

The numbers of offspring produced in each retention chamber was divided by the number of "available female reproductive days" (AFRD) for that chamber and the resulting "offspring/AFRD" data are given in Table 4. AFRD was defined as the sum of the survival periods (days, from day 16) of the females in the chamber (AFRD = 12 for a female surviving to the end of the test). Chambers were excluded from the calculations if the AFRD was less than five, or if no males were present in the chamber on day 16. The data in Table 4 excludes those chambers in which available females were present but no offspring were produced (i.e., offspring/AFRD = 0).

Table 5 gives the offspring/AFRD values on a "per replicate" basis. The total number of offspring for the replicate vessel was divided by the corresponding total AFRD, thereby including the AFRD of non-reproductive chambers. It should be noted that, although the control, solvent control and the two lowest concentrations contained no non-reproductive chambers, the mean offspring/AFRD values differ slightly from those in Table 4 when calculated in this manner. Table 5 also shows the total number of offspring and AFRD from which "offspring/AFRD" was calculated for each replicate. If offspring/AFRD values are multiplied by 12 (see above) the result is "offspring per female (corrected for mortality)".

Using the "per chamber" data in Table 4, the A and B replicates for the control and solvent control were compared (2-sided) using Student s t-test. In each case there was no significant difference (P = 0.05) between replicates, and therefore these were pooled for each treatment. The control and solvent control were similarly compared and were not significantly different (P > 0.2). Therefore the test substance concentrations were compared with the pooled control and solvent control using Dunnett s procedure (Ref 3).

Offspring/AFRD was significantly reduced (P = 0.05) compared with the pooled controls at and above a nominal concentration of 0.00065 ug/L.

The "per replicate" data in Table 5 were examined in a similar manner. The results confirmed the reduction in reproduction and at and above a nominal concentration of 0.00065 ug/L (mean measured concentration of 0.00046 ug/L) at which offspring/AFRD was reduced by 66 percent compared with the pooled controls. There was no effect at a nominal concentration of 0.00033 ug/L (mean measured concentration of 0.00022 ug/L) at which offspring/AFRD was 97 percent of that of pooled controls."

Mortality - The data in Table 1 (total mortality) were analyzed using Dunnett s procedure following arcsine transformation of the square root of the survival coefficient

-6-

(number surviving/number tested) comparing (one-sided) the
test substance concentrations with the pooled controls
(solvent and dilution water control).

Dry Weights - For each sex the A and B replicates for the
control and solvent control were compared (2-sided) using
Student s t-test. The A and B replicates were pooled for
each treatment. For each sex, the control and the solvent
control were similarly compared. There was no difference
between control and solvent control for either sex, therefore
the test substance concentrations were compared (1-sided)
with the pooled controls using Dunnetts procedure.

Reproduction - See Section 12. Reproduction - for detailed
description of data analysis.

13.   Study Author s Conclusions/QA Measures (excerpted from
      submission):

      There were no deleterious effects on mysid survival,
growth (weight) or reproduction during the 28-day exposure

period at a nominal concentration of 0.00033 ug lambda
cyhalothrin/l (mean measured concentration of 0.00022 ug/L
by radiochemistry).

      There was a significant reduction in reproduction of
mysids at a nominal concentration of 0.00065 ug lambda
cyhalothrin/l (mean measured concentration of 0.00046 ug/L
by radiochemistry).

      The maximum acceptable toxicant concentration (MATC),
calculated as the geometric mean of the highest no observed
effect concentration and the lowest concentration causing a
significant effect, was 0.00032 ug/L based on mean measured
concentrations.

QA Measures

      The conduct of this study has been inspected/audited
in accordance with ICI s policies and procedures for Good
Laboratory Practice, as follows.

14. Reviewer s Discussion and Interpretation of Study Results:

The following discrepancies were noted:

a. Test Procedures –

The study design included five mysids per retention
chamber. Current methodology includes only pairs (one
male and one female) per retention chamber.

This study design makes it difficult, if not impossible
to determine the number of young per female, which is a
necessary reproductive parameter for the mysid life-cycle
study. However, since the EPA recommended protocol in
1982 Subdivision E in "Bioassay Procedures for Ocean,
Disposal Permit Program" 1978 recommends five per retention
chamber, EEB will accept the study design. Future
study designs should be based on current methodology.

Only a summary of young per retention chamber per
replicate were submitted (Appendix 5) and the total
available female reproductive days (AFRD) were given
per retention chamber. The study author failed to
report the number of males and females per retention
chamber per replicate at test initiation and daily
throughout the study until test termination.

These raw data are required so that the average number
of young per female may be determined as well as the
brood size, and the percent reproductively active
females. The number of young per female (in this case
only average can be used) divided by the number of
reproductive days per female is the recommended
measurement for reproductive success. With the data
submitted, this can not be calculated. It also appears
from the data that the number of females per treatment
level varied since the number of AFRD varied between
the treatment levels, and was not dose related.

The study author should indicate why a measurement
for residue on day 15 was not taken (at the nominal con-
centration 0.65 ng/l treatment level) when the leak in
the diluter was discovered.

The study author must also report why the measured
concentration data were not available on day 9 except
for the highest dose tested. Especially, since there
was an increase in mortality ranging from 5 to 25%
within each replicate on that day.

b. Statistical Analysis - Based on the data submitted,
    ANOVA statistical analysis along with Duncans multiple
    range test were conducted. The results are as follows:

                    (measured concentrations)

    % survival   NOEL = 1.7 µg/L   LOEL = 3.7 µg/L
                      MATC = > 1.7 µg/L   < 3.7 µg/L

    Limited Reproduction Data

    No. of Young   NOEL = 0.22 µg/L   LOEL = 0.46 µg/L
    Per Reproductive   MATC = > 0.22 µg/L   < 0.46 µg/L

    (per Day replicate)

    No. of Young   NOEL = 0.22 µg/L   LOEL = 0.46 µg/L
    per treatment level MATC = 0.22 ug/L   < 0.46 ug/L

    Dry Weights   Female - NOEL = 1.7 µg/L   LOEL = 3.7 µg/L
    Effects on   MATC > 1.7 µg/L   < 3.7 µg/L
    Dry Weights
                   Male -   NOEL = 1.7 µg/L   LOEL = 3.7 µg/L
                            MATC > 1.7 µg/L   < 3.7 ug/L

    The NOEL for female weight was higher than reported
    by the study author. This variability may because
    the controls were not pooled when conducting the statistical
    analysis, as the study author has done.

c. Discussion of Results - Additional raw data are required
    before the complete reproductive success can be calculated.
    With the current data, the number of young per reproductive
    per female can not be determined. This is a primary measure-
    ment for reproductive success.

    Based on the data submitted it appears that reproduction
    may be affected at levels as low as 0.46 ng/L. This cannot
    be confirmed.

    Survival and dry weights indicated a NOEL = 1.7 ng/L and
    a LOEL of 3.7 ng/L.

d. Adequacy of Study

    1) Classification - Supplemental for 98.5 percent w/w
                         lambda cyhalothrin - also known as
                         PP 321.

2) Rationale - The study appears to be scientifically
sound, but until the necessary raw data
with regards to number of males, females
daily per test chamber per replicate are
reported the reproductive success can not
be determined. Other discrepencies outlined
in section 14 also need to be addressed
by the study author.

3) Reparability - Depending on data that needs to be
submitted.

Page _____ is not included in this copy.

Pages _11_ through _26_ are not included in this copy.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

___._ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

__☒__ FIFRA registration data.

_____ The document is a duplicate of page(s) _____.

_____ The document is not responsive to the request.

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

```
  SAVED'
 QED-LIB(ANOVAEZ)
 .1
 00010 //RMHXX JOB'(PHEDPPISP,C803),'LEE',PRTY=4
 00020 /*ROUTE PRINT HOLD
 00030 //SAS  EXEC SAS,REGION=1200K,PRINT=A
 00040 //INDATA DD DSN=RMHPHED.ANOVADT,DISP=SHR
 00050 OPTIONS LINESIZE=130;
 00060 DATA A;
 00070 INFILE INDATA  MISSOVER;
 00080 INPUT TRT $ RESP1-RESP20;
 00090 PROC PRINT;
 00100 DATA B; SET A;
 00110 DROP RESP1-RESP20;
  OUT!
 QED
 cae
 IKJ56500I SUBCOMMAND CAE NOT FOUND
 QED
 end
 QED-LIB(ANOVAREZ)
 end nosave
 READY
 1 cae
 IKJ52827I  CAE
       A 10 15
       B 15 35
       C 25 30
       D 45 25
       E 15 30
       F 60 40
       G 75 65
 READY
 qed lib(anovarez)
 QED
 1 40
 00040 //INDATA DD DSN=RMHPHED.INITIAL,DISP=SHR
 c /initial/cae/
 1 *
 00040 //INDATA DD DSN=RMHPHED.CAE,DISP=SHR
 submit *
   JOB RMHXX     (JOB09378) SUBMITTED
 SUBMIT COMPLETED
 QED
 q loc
  JOB#  JOBNAME   QUEUE      POSITION  LINES  DESTINATION
   8146 RMH       TSO USER      224
   9378 RMHXX     INPUT     A    28
   8251 RMHXX     OUTPUT    A   1075      55 HOLD
   8457 RMHXX     OUTPUT    A   1083     309 HOLD
   8551 RMHXX     OUTPUT    A   1086     306 HOLD
   8621 RMHXX     OUTPUT    A   1092     306 HOLD
   8749 RMHXX     OUTPUT    A   1097     306 HOLD
   2607 RMHGO     OUTPUT    A   1219    1025 HOLD
   2612 RMHGO     OUTPUT    A   1220    1025 HOLD
   2620 RMHGO     OUTPUT    A   1221    1025 HOLD
 QUEUE
 loc
  JOB#  JOBNAME   QUEUE      POSITION  LINES  DESTINATION
   8146 RMH       TSO USER      213
   9378 RMHXX     INPUT     A    26
   8251 RMHXX     OUTPUT    A   1065      55 HOLD
   8457 RMHXX     OUTPUT    A   1073     309 HOLD
   8551 RMHXX     OUTPUT    A   1076     306 HOLD
   8621 RMHXX     OUTPUT    A   1082     306 HOLD
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   2620 RMHGO   OUTPUT   A   1216   1025 HOLD
QUEUE
1
00010 A .97 .81 .94 .93 1.02 .88
00020 A .84 1.03 .89 .99 .89 .83 .84 1.11 1.05
00030 B .81 .79 .81 .75 .79 .94 1.03 .96 .89 .91 .84
00040 B .89 .93 .86 1.21 1.21 1.01 1.22 .82 .97 .94
00050 C .68 .96 .80 .79 .84 .69 .86 .85 .74
00060 C .73 .86 .69 1.27 1.27 .86
00070 D .91 1.15 .82 .81 .74 .75 .77 .97 .78 .69 .89 .71 1.06
00080 E .68 .87 .72 .71 1.01 .54 .94 .77
00090 E .92 .59 .68 .76 .99 .83 1.08
00100 E 1.08 .80 .77 .73 1.05 .69 1.00
00110 F 1.12 .53 .69 .75 .78 .62 .53 .74
00120 G .57 .51 .53
00130 G .54 .61 .62
END OF DATA
unnum
end save
SAVED
QED-LIB(ANOVAREZ)
qed lib(anovaez)
QED
£ 40
INVALID COMMAND SYNTAX
QED
1 40
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c /caf/caj/
submit *
   JOB RMHXX   (JOB09794) SUBMITTED
SUBMIT COMPLETED
QED
qed cak new
INVALID COMMAND SYNTAX
QED
qed cak new
INPUT
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00070 d .77 ,
00080 d .78 .83 .96 .84 .69
00090 d .71 .85 .83 .82 .75 .81 .72
00100 e .77 .59 .75 .88 .79
00110 e .55 .83 .94 .91
00120 f .69 .58 .72 .89 .54
00130 f .83 .63 .64 .59 .67 .54 .63
00140 g .50 .62
00150 g .59 .578
00160 g .61 .53
00170
QED
1
00010 A .79 .69 .75 .74 .69 .84 .84 .77 .96 .81 .43
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00030 B .62 .72 .87 .84 .81 .71
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00050 C .66 .63 .64 .84 .90 .71
00060 C .91 .67 .78 .84 .83 .74 .87 .92
00070 D .77

28

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00100 E .77 .57 .75 .88 .78
00110 E .55 .83 .94 .91
00120 F .69 .58 .72 .89 .54
00130 F .83 .63 .64 .59 .67 .54 .63
00140 G .50 .62
00150 G .59 .57
00160 G .61 .53
END OF DATA
unnumm
INVALID COMMAND SYNTAX
QED
unnum
end sdve
IKJ56712I INVALID KEYWORD, SAVE
IKJ56703A REENTER THIS OPERAND -
end save
IKJ56712I INVALID KEYWORD, END
IKJ56703A REENTER THIS OPERAND -
:
QED
unnum
DATA SET IS NONUM
end save
SAVED
QED-LIB(ANOVAEZ)
qed lib(anovaez)
QED
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c /caf/cak/
submit *
   JOB RMHXX   (JOB09986) SUBMITTED
SUBMIT COMPLETED
QED
q loc
 JOB#  JOBNAME    QUEUE    POSITION  LINES  DESTINATION
 8146  RMH        TSO USER     164
 9986  RMHXX      INPUT    A    15
 8251  RMHXX      OUTPUT   A  1057      55 HOLD
 8457  RMHXX      OUTPUT   A  1063     309 HOLD
 8551  RMHXX      OUTPUT   A  1064     306 HOLD
 8621  RMHXX      OUTPUT   A  1070     306 HOLD
 8749  RMHXX      OUTPUT   A  1073     306 HOLD
 9378  RMHXX      OUTPUT   A  1101     322 HOLD
 9794  RMHXX      OUTPUT   A  1110     315 HOLD
 2607  RMHGO      OUTPUT   A  1209    1025 HOLD
 2612  RMHGO      OUTPUT   A  1210    1025 HOLD
 2620  RMHGO      OUTPUT   A  1211    1025 HOLD
QUEUE
fetch 9378
    1                   J E S 2   J O B   L O G  --  S Y S T E M   E P A 2  --  N O D E   N C C I B M 1
QUEUE
f 'n.c.' all
  168 NOTE: COPYRIGHT (C) 1984,1986 SAS INSTITUTE INC., CARY, N.C.  27511, U.S.A.
  242       CARY, N.C. 27511-8000
QUEUE
1 242 999
  242       CARY, N.C. 27511-8000
  243                                              SAS                              11:42 THURSDAY, MARCH 3, 1986
1
  244
  245                                                              R   R   R   R   R   R   R   R   R   R   R
  246                       R   R   R   R   R   R   R   R   R   E   E   E   E   E   E   E   E   E   E   E
  247                       E   E   E   E   E   E   E   E   E   S   S   S   S   S   S   S   S   S   S   S
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B S	R T	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	1 0	1 1	1 2	1 3	1 4	1 5	1 6	1 7	1 8	1 9	2 0
1	A	10	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	B	15	35	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	C	25	30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
4	D	45	25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
5	E	15	30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
6	F	60	40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
7	G	75	65	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	7	A B C D E F G

NUMBER OF OBSERVATIONS IN DATA SET = 140

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
    ONLY   14 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EFFECT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V
MODEL	6	1749.97415104	291.66235851	6.39	0.0139	0.845651	19.099
ERROR	7	319.40671188	45.62953027		ROOT MSE		EFFECT MEA
CORRECTED TOTAL	13	2069.38086293			6.75496338		35.3676701

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR >
TRT	6	1749.97415104	6.39	0.0139	6	1749.97415104	6.39	0.013

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: EFFECT
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
      NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=7 MSE=45.6295

NUMBER OF MEANS	2	3	4	5	6	7
CRITICAL RANGE	15.3404	16.6017	16.3463	17.1174	17.7157	17.765

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MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING		MEAN	N	TRT
		A	56.842	2	G
		A			
B		A	44.982	2	F
B					
B	C		36.051	2	D
B	C				
B	C		31.593	2	C
B	C				
B	C		29.517	2	B
B	C				
B	C		27.967	2	E
	C				
	C		20.602	2	A

QUEUE

loc

JOB#	JOBNAME	QUEUE		POSITION	LINES	DESTINATION
8146	RMH	TSO USER		159		
8251	RMHXX	OUTPUT	A	1056	55	HOLD
8457	RMHXX	OUTPUT	A	1062	309	HOLD
8551	RMHXX	OUTPUT	A	1063	306	HOLD
8621	RMHXX	OUTPUT	A	1069	306	HOLD
8749	RMHXX	OUTPUT	A	1071	306	HOLD
9378	RMHXX	OUTPUT	A	1099	322	HOLD
9794	RMHXX	OUTPUT	A	1108	315	HOLD
9986	RMHXX	OUTPUT	A	1117	318	HOLD
2607	RMHGO	OUTPUT	A	1210	1025	HOLD
2612	RMHGO	OUTPUT	A	1211	1025	HOLD
2620	RMHGO	OUTPUT	A	1212	1025	HOLD

QUEUE
fetch 9794

													R	R	R	R	R	R	R	R	R	R
		R	R	R	R	R	R	R	R	R	R	E	E	E	E	E	E	E	E	E	E
		E	E	E	E	E	E	E	E	E	E	S	S	S	S	S	S	S	S	S	S
D	T	S	S	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P
B	R	P	P	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	2
S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
1	A	0.93	0.94	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	B	0.87	1.01	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	C	0.80	0.95	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
4	D	0.89	0.83	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
5	E	0.79	0.90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
6	F	0.78	0.68	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
7	G	0.54	0.59	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS   LEVELS   VALUES

TRT   7   A B C D E F G

NUMBER OF OBSERVATIONS IN DATA SET = 140

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
      ONLY   14 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V
MODEL	6	0.21197143	0.03532857	7.03	0.0107	0.857589	8.632
ERROR	7	0.03520000	0.00502857		ROOT MSE		RESP MEAN
CORRECTED TOTAL	13	0.24717143			0.07091242		0.8214285

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	6	0.21197143	7.03	0.0107	6	0.21197143	7.03	0.010

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

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ALPHA=0.05 DF=7 MSE=.0050286

NUMBER OF MEANS	2	3	4	5	6	7
CRITICAL RANGE	0.167552	0.174282	0.177899	0.179695	0.180723	0.181252

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	0.94000	2	B
	A			
	A	0.93500	2	A
	A			
B	A	0.87500	2	C
B	A			
B	A	0.86000	2	D
B	A			
B	A	0.84500	2	E
B				
B	C	0.73000	2	F
	C			
	C	0.56500	2	G

QUEUE
fééhc
Q0801 INVALID COMMAND - ENTER: "H" FOR COMMAND LIST
QUEUE
fetch 8551
   1   J E S 2 J O B L O G -- S Y S T E M E P A 2 -- N O D E N C C I B M 1
QUEUE
f 'n.c.' all
   168 NOTE: COPYRIGHT (C) 1964,1986 SAS INSTITUTE INC., CARY, N.C. 27511, U.S.A.
   226   CARY, N.C. 27511-8000
QUEUE
1 226 999
   226   CARY, N.C. 27511-8000
   227   SAS   11:02 THURSDAY, MARCH 3, 1988
1
   228
   229   R R R R R R R R R R R
   230   R   R   R R R R R R R E E E E E E E E E E E
   231   E   E   E E E E E E E S S S S S S S S S S S
   232   O   T   S   S   S S S S S S S P P P P P P P P P P P
   233   B   R   P   P   P P P P P P P 1 1 1 1 1 1 1 1 1 1 2
   234   S   T   1   2   3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0
   235
   236   1   A   1.01 0.60 . . . .
   237   2   B   0.99 0.79 . . . .
   238   3   C   0.31 0.30 . . . .
   239   4   D   0.22 0.10 . . . .
   240   5   E   0.18 0.18 . . . .
   241   6   F   0.00 0.02 . . . .
   242   7   G   0.00 0.00 . . . .
   243   SAS   11:02 THURSDAY, MARCH 3, 1988
2
   244
   245   GENERAL LINEAR MODELS PROCEDURE
   246
   247   CLASS LEVEL INFORMATION
   248
   249   CLASS   LEVELS   VALUES
   250
   251   TRT   7   A B C D E F G
   252
   253

female weight mysid life' PP321

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257 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
258   ONLY   14 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.
259   SAS   11:02 THURSDAY, MARCH 3, 1988

260
261   GENERAL LINEAR MODELS PROCEDURE
262
263 DEPENDENT VARIABLE: RESP
264

265 SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.
267 MODEL	6	1.60464286	0.26744048	16.79	0.0008	0.935029	37.59
269 ERROR	7	0.11150000	0.01592857		ROOT MSE		RESP ME
271 CORRECTED TOTAL	13	1.71614286			0.12620844		0.335714

272
273

274 SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR >
276 TRT	6	1.60464286	16.79	0.0008	6	1.60464286	16.79	0.000

277   SAS   11:02 THURSDAY, MARCH 3, 1988

278
279   GENERAL LINEAR MODELS PROCEDURE
280
281   DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
282   NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
283   NOT THE EXPERIMENTWISE ERROR RATE
284
285   ALPHA=0.05 DF=7 MSE=.0159286
286

287 NUMBER OF MEANS   2   3   4   5   6   7
288 CRITICAL RANGE 0.298205 0.310183 0.316621 0.319818 0.321646 0.322588

290   MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.
291

DUNCAN	GROUPING	MEAN	N	TRT
	A	0.8900	2	B
	A			
	A	0.8050	2	A
	B	0.3050	2	C
	B			
	B	0.1800	2	E
	B			
	B	0.1600	2	D
	B			
	B	0.0100	2	F
	B			
	B	0.0000	2	G

(handwritten margin notes:) OFFSPRIN... A... USING DATA FROM TABLE 5 NOEL = 0.2... LOEL 0....

(handwritten bottom right:) 34

QUEUE
fetch 8457
  1
QUEUE
f n.c. all

JES2 JOB LOG -- SYSTEM EPA2 -- NODE NCCIBM1

EUE.

226 99

226   CARY, N.C. 27511-8000

227   SAS   11:00 THURSDAY, MARCH 3, 1988

O B S	T R T	R E S P 1	R E S P 2	R E S P 3	R E S P 4	R E S P 5	R E S P 6	R E S P 7	R E S P 8	R E S P 9	R E S P 1 0	R E S P 1 1	R E S P 1 2	R E S P 1 3	R E S P 1 4	R E S P 1 5	R E S P 1 6	R E S P 1 7	R E S P 1 8	R E S P 1 9	R E S P 2 0
1	A	10	32	12	31	15	27	2	.	.	.	.	.	.	.	.	.	.	.	.	.
2	B	19	26	18	68	4	30	32	.	.	.	.	.	.	.	.	.	.	.	.	.
3	C	3	6	2	22	6	12	4	.	.	.	.	.	.	.	.	.	.	.	.	.
4	D	0	4	0	9	6	0	5	0	.	.	.	.	.	.	.	.	.	.	.	.
5	E	8	5	9	0	0	8	9	.	.	.	.	.	.	.	.	.	.	.	.	.
6	F	0	0	0	0	0	0	1	.	.	.	.	.	.	.	.	.	.	.	.	.
7	G	0	0	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

243   SAS   11:00 THURSDAY, MARCH 3, 1988

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	7	A B C D E F G

NUMBER OF OBSERVATIONS IN DATA SET = 140

257 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
258   ONLY   48 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

259   SAS   11:00 THURSDAY, MARCH 3, 1988

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V
MODEL	6	4517.47916667	752.91319444	8.41	0.0001	0.551620	102.080
ERROR	41	3672.00000000	89.56097561			ROOT MSE	RESP MEA
CORRECTED TOTAL	47	8159.47916667				9.46366608	9.2708333

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR >
TRT	6	4517.47916667	8.41	0.0001	6	4517.47916667	8.41	0.000

277   SAS   11:00 THURSDAY, MARCH 3, 1988

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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=41 MSE=89.561

WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=6.7354

NUMBER OF MEANS	2	3	4	5	6	7
CRITICAL RANGE	10.4152	10.9495	11.3087	11.5506	11.7504	11.9112

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	28.143	7	B
	A			
	A	18.429	7	A
	B	7.857	7	C
	B			
	B	5.571	7	E
	B			
	B	3.000	6	D
	B			
	B	0.143	7	F
	B			
	B	0.000	5	G

[Handwritten notes in right margin:]

NO. YOUNG PER Treatment level

NOEL= 0.22 ng/l

LOEL= 0.46 ng/l-

36

JEUE
etch 8251
   1   J E S 2   J O B   L O G --- S Y S T E M   E P A 2 --- N O D E   N C C I B M 1
JEUE
 'n.c.' all
JEUE
 'n.c.' all
JEUE
etch 8251
   1   J E S 2   J O B   L O G --- S Y S T E M   E P A 2 --- N O D E   N C C I B M 1
JEUE
 'n.c.' all
JEUE
oc 8251
JOB# JOBNAME   QUEUE   POSITION LINES DESTINATION
 8251 RMHXX   OUTPUT   A   1088   55 HOLD
 8457 RMHXX   OUTPUT   A   1096   309 HOLD
 8551 RMHXX   OUTPUT   A   1099   306 HOLD
 8621 RMHXX   OUTPUT   A   1105   306 HOLD
 8749 RMHXX   OUTPUT   A   1110   306 HOLD
JEUE
etch 8749
   1   J E S 2   J O B   L O G --- S Y S T E M   E P A 2 --- N O D E   N C C I B M 1
JEUE
 'n.c.' all
 168 NOTE: COPYRIGHT (C) 1984,1986 SAS INSTITUTE INC., CARY, N.C. 27511, U.S.A.
JEUE
 'n.c.' all
 226   CARY, N.C. 27511-8000
JEUE
 226 999
 226   CARY, N.C. 27511-8000
 227

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  227
  230                 R     R     R   R   R   R   R   R   R   E   E   E   E   E   E   E   E   E   E   E
  231                 E     E     E   E   E   E   E   E   E   S   S   S   S   S   S   S   S   S   S   S
  232       O    T    S     S     S   S   S   S   S   S   S   P   P   P   P   P   P   P   P   P   P   P
  233       B    R    P     P     P   P   P   P   P   P   P   1   1   1   1   1   1   1   1   1   1   2
  234       S    T    1     2     3   4   5   6   7   8   9   0   1   2   3   4   5   6   7   8   9   0
  235
  236       1    A   0.76  0.85   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  237       2    B   0.76  0.77   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  238       3    C   0.73  0.82   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  239       4    D   0.81  0.78   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  240       5    E   0.70  0.82   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  241       6    F   0.68  0.65   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  242       7    G   0.56  0.58   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  243                                                    SAS                        11:10 THURSDAY, MARCH 3, 1988
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  244
  245                                  GENERAL LINEAR MODELS PROCEDURE
  246
  247                                    CLASS LEVEL INFORMATION
  248
  249                            CLASS     LEVELS     VALUES
  250
  251                            TRT         7        A B C D E F G
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  253
  254                    NUMBER OF OBSERVATIONS IN DATA SET = 140
  255
  256
  257 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
  258      ONLY    14 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.
  259                                                    SAS                        11:10 THURSDAY, MARCH 3, 1988
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  260
  261                                  GENERAL LINEAR MODELS PROCEDURE
  262
  263 DEPENDENT VARIABLE: RESP
  264
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SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V
MODEL	6	0.08747143	0.01457857	6.20	0.0150	0.841707	6.608
ERROR	7	0.01645000	0.00235000		ROOT MSE		RESP MEAN
CORRECTED TOTAL	13	0.10392143			0.04847680		0.7335714

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	6	0.08747143	6.20	0.0150	6	0.08747143	6.20	0.0150

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  277                                                    SAS                        11:10 THURSDAY, MARCH 3, 1988
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  278
  279                                  GENERAL LINEAR MODELS PROCEDURE
  280
  281              DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
  282              NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
  283                    NOT THE EXPERIMENTWISE ERROR RATE
  284
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NUMBER OF MEANS	2	3	4	5	6	7
CRITICAL RANGE	0.114541	0.119142	0.121614	0.122842	0.123545	0.123906

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	0.80500	2	A
	A			
	A	0.79500	2	D
	A			
B	A	0.77500	2	C
B	A			
B	A	0.76500	2	B
B	A			
B	A	0.76000	2	E
B				
B	C	0.66500	2	F
	C			
	C	0.57000	2	G

mean male weights (handwritten)

QUEUE
feet
Q0801 INVALID COMMAND - ENTER: "H" FOR COMMAND LIST
QUEUE
fetch 8251
      1
        J E S 2   J O B   L O G -- S Y S T E M   E P A 2 -- N O D E   N C C I B M 1
QUEUE
f 'n.c.' all
QUEUE
bottom
   55   22   IEF624I INCORRECT USE OF PERIOD IN THE DSNAME FIELD
QUEUE
top
      1
        J E S 2   J O B   L O G -- S Y S T E M   E P A 2 -- N O D E   N C C I B M 1
QUEUE
f 'error'
   3 10.49.24 JOB 8251 IEF452I RMHXX   JOB NOT RUN - JCL ERROR
QUEUE
f 'error' all
QUEUE
end
QED
end nosave
QED-LIB(ANOVAEZ)

INPUT
00340 !
QED
end nosave
QED-LIB(ANOVAEZ)

INPUT
00340
QED

QED
end
NOTHING SAVED-ENTER SAVE OR END
nosave
IKJ56500I SUBCOMMAND NOSAVE NOT FOUND
QED
end nosave
QED-LIB(ANOVAEZ)

38