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Bioassays using *Eisenia fetida* to assess mortality of chemicals of concern in soils

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executive summary

Eight soil samples from locations in and near Los Alamos National Laboratory near Los Alamos New Mexico Project were used to determine earthworm mortality of chemicals of concern. Samples collected from the site by Los Alamos National Laboratory (LANL) and their subcontractors were shipped to ecological planning and toxicology, inc., Corvallis, OR in late June and in early July from locations in and near the Los Alamos National Laboratory, New Mexico.. The ASTM E1676-97 Standard Guide for Conducting Laboratory Soil Toxicity or Bioaccumulation Test with the Lumbricid Earthworm *Eisenia fetida*" was performed using a 28-day exposure. Negative Controls and Positive controls (using 2-chloroacetamide at three concentrations) were evaluated. Each test and control sample was tested using five replicates.

Soils were sieved to remove plant materials, stones, and miscellaneous debris in preparation of the test set up. The samples were allowed to air dry to lower the moisture content sufficiently to permit testing with terrestrial species. Also, initial pH and soil moisture fraction were determined. Sieved, partially dried soils were placed in glass (1 quart mason jar) test containers and hydrated. The target hydration level was 35% soil moisture fraction. Acclimated adult earthworms (*Eisenia fetida*) were removed from a peat moss bedding mix. Thirty-five worms were selected and their combined live weight was recorded prior to placement into each test units.

In all of the samples and controls, the worms exhibited normal burrowing behavior soon after introduction into the test units. Daily observations were recorded. On day 28, soils were removed from the test units and the number of living worms and their combined live weight was recorded for each test unit. Final moisture content and pH were also recorded.

Survival of worms was 100% for five of the site soils and in the negative controls (in the other three site sample there was one worm death each). Statistical comparisons of treatments against negative controls were confounded by the situation that the starting weights of the 35 worms differed among treatments. By normalizing the final weights (i.e., expressing final weight as a percentage of starting weight), three groups were identified according to Bonferroni comparison of means; samples CAMO 05 61160 (our sample 5) and CAMO 05 61161 (our sample 6) having the greatest weight loss and distinguishable from the other two groups.

Performance of negative and positive controls as well as the test room environment being within guideline specifications, and so despite the problem of differential starting weights (all within specified weight ranges), the results of this test are valid for assessing acute mortality due to any constituents of concern in the test soils. Additional insights might be gleaned from comparisons of the results with analytical chemical information obtained from the sample splits analyzed for constituents of concern.

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abbreviations

C ..... Celsius

ep and **t** ..... **e**cological planning and **t**oxicology, inc.

g ..... gram

ppm ..... part per million

RH ..... Relative Humidity

1. Project Title

Bioassays using *Eisenia fetida* to assess mortality and bioaccumulation of Constituents of Concern (CoC) in soils from Los Alamos National Laboratory (LANL) Project: Los Alamos/Pueblo Canyon Surface Aggregate.

2. Client

Los Alamos National Laboratory, Los Alamos, NM 87545.

3. Scope of Work

ecological planning and toxicology, inc. (ep and t) was contracted to perform laboratory tests on a series of environmental samples from locations in and near the Los Alamos National Laboratory, Los Alamos, NM. The tests followed procedures described in the ASTM E1676-97 "Standard Guide for Conducting Laboratory Soil Toxicity or Bioaccumulation Test with the Lumbricid Earthworm *Eisenia fetida*." Samples were collected by Los Alamos National Laboratory staff and their subcontractors on 30 June 2005 and shipped to Corvallis on 5 July. Insufficient material was received and a second collection was made and received in Corvallis on 12 July 2005. Eight site soils were tested. **ep** and **t** was not involved in the sampling design used to collect samples. Chemical analyses of sample-splits was performed by a LANL contract analytical laboratory on the samples before the in-life testing began, however, the results of those analyses are not incorporated into this data report. The entire scope of work performed by **ep** and **t** was the conduct of the laboratory toxicity tests and preparation of this report and the accompanying data package.

3.1. Samples Received

Samples were shipped to **ep** and **t** via Federal Express. Samples were shipped in plastic 2-liter polyethylene bags and placed in ice chests. Chain-of-Custody forms were executed by Joan Yocum upon receipt of the eight samples 6 July 2005 and 12 July 2005 (Table 1).

Table 1. List of samples received for earthworm mortality tests.

Sample Identification	ep and t I.D.	Sample Type
CAMO 05 61156	LAEW1	Soil
CAMO 05 61157	LAEW2	soil
CAMO 05 61158	LAEW3	soil
CAMO 05 61159	LAEW4	soil
CAMO 05 61160	LAEW5	soil
CAMO 05 61161	LAEW6	soil
CAMO 05 61162	LAEW7	soil
CAMO 05 61183	LAEW8	soil

CNA

3.2. Dates of Test

Following receipt, the soils were processed. The samples were prepared in a well-ventilated laboratory. The tests were performed between 24 July and 20 August 2005 (Table 2). The in-life portion of the test was terminated and the worms were harvested after 28 days with the exception of the positive control, which was harvested at 26 days.

Table 2. Earthworm (Eisenia fetida) mortality test dates.

Sample ID	Test Initiation	Test Termination
CAMO 05 61156	7-24-2005	8-20-2005
CAMO 05 61157	7-24-2005	9-17-2002
CAMO 05 61158	7-24-2005	8-20-2005
CAMO 05 61159	7-24-2005	8-20-2005
CAMO 05 61160	7-24-2005	8-20-2005
CAMO 05 61161	7-24-2005	8-20-2005
CAMO 05 61162	7-24-2005	8-20-2005
~~CAM~~O 05 61183	7-24-2005	8-20-2005
Negative Controls	7-24-2005	8-20-2005
Positive controls	7-24-2005	8-20-2005

CAIA

3.3. Personnel Involved

Personnel and their involvement in the earthworm mortality tests were included staff of LANL and **ep** and **t** (Table 3). Laboratory work was conducted by Dr. Kapustka and Joan Yocum.

Table 3. Personnel involved in the test.

Project Title	Person	Affiliation
Project Manager, Technical Point of Contact	Steve Bolivar	LANL
Principal Investigator	Lawrence A. Kapustka, Ph.D.	ep and t
Technician	Joan Yocum	ep and t
Contracts Manager/Data Manager	Elizabeth A. Kapustka	ep and t

4. Approach

The study performed for this project consisted of a laboratory earthworm mortality and bioaccumulation test following the guidelines of the ASTM E1676-97 Standard Guide for Conducting Laboratory Soil Toxicity or Bioaccumulation Test with the Lumbricid Earthworm *Eisenia fetida*. All other activities related to the project were done without involvement of **ep** and **t** personnel. Consequently, for this report, comments are restricted to the laboratory study aspects.

4.1. Summary of Test Method

ASTM E1676-97 Standard Guide for Conducting Laboratory Soil Toxicity or Bioaccumulation Test with the Lumbricid Earthworm *Eisenia fetida* was selected by LANL for this project. This method provides descriptions of steps used in testing environmental (i.e., site) samples to determine earthworm mortality vis-à-vis reference samples. Animal health may also be evaluated in comparison to endpoints measured using negative controls.

The basic steps in the test involve:

- preparation of test matrix (natural soil or artificial soil) in test containers;
- introduction of adult worms into the test matrix;

- observation of behavior, live weight, and survival over the test period; and
- quantitative measures of tissue concentrations at the conclusion of the test.

Generalized ranges of test conditions appropriate for the tests (e.g., moisture, temperature, ratio of animal mass to soil mass, and pH) and descriptions of other factors important to the conduct of the test are detailed in the Guide.

The methods present the minimum standards to be followed. We increased the mass of soil per test unit to ~ 600g ambient soil weight, which should lower any potential impact from starvation of the test animals as the potential quantity of food is increased, whereas the concentration of CoC would be maintained.

4.2. Study Design

The laboratory study consisted of tests on undiluted soil samples (i.e., 100% site soils), plus negative and positive controls conducted in artificial soil. Each test including the negative control had five replicates. Positive Controls with five replicates at each of three concentrations (19.25, 38.50, and 77.00 mg/kg 2-chloroacetamide) were evaluated.

4.2.1. <u>species used</u>

Eisenia fetida from the Dort Worm Farm, Philomath, Oregon, were used for the test. All earthworms were from the same population and the species verified using Fender (1985) systematic key. They were received on 14 July 2005. Upon receipt, they were placed in to hydrated peat moss for holding until placement into test jars. The worms were fed Purina "Meat Builder" chicken feed. All worms placed into test jars were fully clitellated adults.

4.2.2. <u>test conditions</u>

The test room is a rectangular room with cement floors. The room was clean before the test according to ecological planning and toxicology, inc. SOPs. The room has dedicated controls for temperature, ventilation, and lighting. Exhaust fans provide fresh air and good circulation. The target temperature was set at 22 C. The Guide recommends ambient temperatures between 19 C and 25 C. Conditions during the test satisfied the guidelines (Table 1, Appendix A). Ambient room light was supplemented by Westinghouse Real Lite™, 48-inch fluorescent, 40 Watt, Full Spectrum bulbs (Domestic Code F40T12/FS). The light was sufficient to promote burrowing in the samples (Appendix A). The lights were on 24-hours a day. All water used, for both the worm holding and the experiment itself, met ASTM Type II water specifications.

Tests were conducted using freshly washed quart-size mason jars fitted with perforated lids to allow gas exchange. Each jar constitutes a test unit. The jars were placed on tables covered with white paper and marked with a grid layout to facilitate randomization.

4.2.3. <u>samples tested</u>

The soil samples required drying and sieving prior to setting up the test units. Once samples had dried sufficiently, the moisture of each sample was determined gravimetrically, and subsequently re-hydrated to 35% soil moisture (Table 4). The mass of soil per replicate was targeted to be 600 g ambient dry weight.

Table 4 Soil moisture fraction and mass of soil in each replicate.

Sample ID	Soil Moisture Fraction (SMF)	Soil Mass (g ambient weight)	Soil Mass Hydrated to 0.35 SMF (g wet weight)
CAMO 05 61156	0.011	606	809
CAMO 05 61157	0.058	635	809
CAMO 05 61158	0.014	608	809
CAMO 05 61159	0.090	661	809
CAMO 05 61160	0.021	612	809
CAMO 05 61161	0.010	604	810
CAMO 05 61162	0.021	612	810
CAMO 05 61183	0.090	661	810
Negative Control	0.021	612	809
Positive Control 19.25	0.021	612	809
Positive Control 38.50	0.021	612	809
Positive Control 77.00	0.021	612	809

4.2.4. endpoints measured

Worm adult live weight, adult worm count, and mortality were quantified at the end of 28 days. Observations of general condition and behavior of worms were made. Additionally, the presence of cocoons and hatchlings were noted.

4.2.5. Controls

The control soil, an artificial soil prepared in the lab, consisted of 70% 70-mesh silica sand, 20% fine kaolin clay, 10% dried sieved peat moss and 0.4% $CaCO_3$. A total of 10 kg of soil was made in 4 kg batches and then blended together. The total supplies used were 8000 g sand, 2000 g clay, 1000 g peat moss, and 40 g $CaCO_3$. This soil was used for both the positive and negative control samples.

5. Results

This section presents environmental conditions, beginning and ending pH determinations, and final quantitative measurements of survival and live weights of animals in negative controls, positive controls, and test samples.

5.1. Test room environment

The test room environmental parameters were within Guideline specifications of 22 $\pm$ 2 C (Table 5).

Table 5. Environmental parameters of test room.

Minimum	maximum	mean
Temperature (C)		
21.4	22.2	21.8
Relative Humidity (%)		
35.0	57.0	55.8

5.2. *Soil pH*

Soil pH was determined at the beginning of the test for the batch soil and at the end of the test from replicates one of each test soil. The values measured are generally considered favorable for terrestrial earthworms (Table 6).

Table 6. Initial and final pH values for the test soils.

Soil Sample I.D.	Initial pH	Final pH
CAMO 05 61156	6.36	6.45
CAMO 05 61157	7.27	7.37
CAMO 05 61158	6.75	6.83
CAMO 05 61159	6.75	6.67
CAMO 05 61160	7.44	7.53
CAMO 05 61161	6.50	6.65
CAMO 05 61162	6.22	6.35
CAMO 05 61183	5.53	5.71
Negative Controls	7.27	7.23

5.3. *Qualitative Observations Day-28*

Worms in ep and t sample numbers 19, 38 and 77 (our codes for the three positive control solution concentrations) exhibited lethargic behavior that is typical in these controls. This was true for all replicates in all positive control treatments. All other treatment exhibited normal behavior in all replications.

5.4. *Negative Controls*

Survival of Negative Controls was 100% for the 28-day exposure period (Figure 1).

5.5. *Positive Controls*

Positive controls were tested during the four-week test period. The nominal target concentrations were 19.25, 38.5, and 77 ppm 2-chloroacetamide. Mortality occurred early in the exposure period and was well within the typical response ranges observed in past tests (Table 2). The LC_{50} value was calculated from the positive control data using Trimmed Spearman-Karber procedures (US EPA, no date). The LC_{50} value was calculated to be 54.4 ppm for 2-chloroacetamide with the respective 95% upper confidence and 95% lower confidence values at 57.4 and 51.7 ppm 2-chloroacetamide. The LC_{50} value for this test fell at the mean of the 95% upper confidence for previous tests performed at our laboratory (Figure 3).

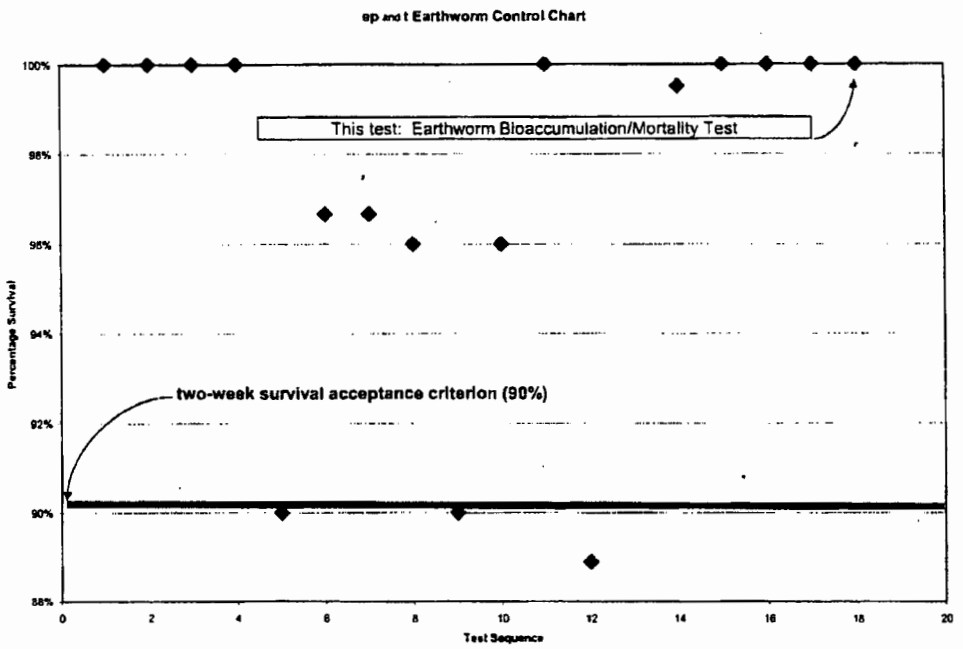

Figure 1. Control Chart Survival: Negative Control of tests performed at the ep and t lab.

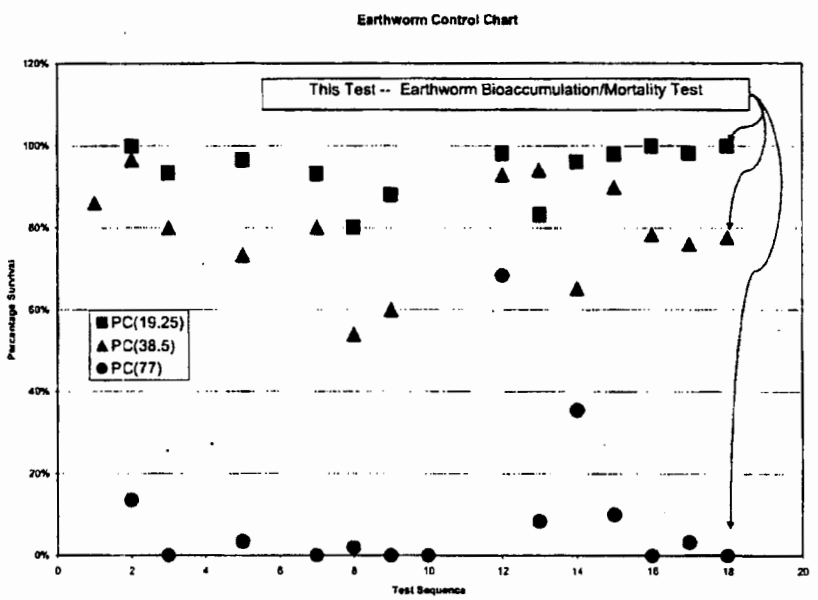

Figure 2. Control Chart Survival: Positive Controls of tests performed at the ep and t lab.

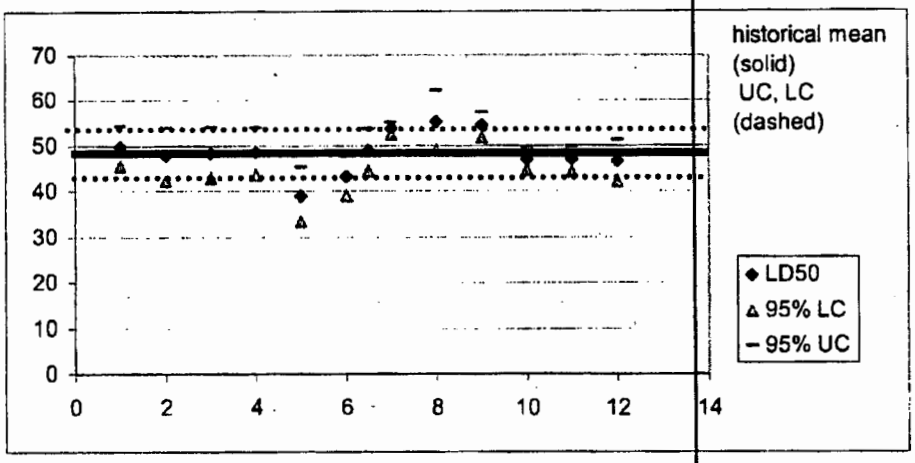

Figure 3. LC_{50} Values for Positive Controls of tests performed at the ep and t lab (entries to the far right are from this test).

5.6. Site Soils

Survival was 100% in five of the eight site samples, the negative controls, and the lowest treatment in the positive controls (Table 7)

Table 7. Mean survival percentages and replicates with juveniles observed in samples (* = statistically significant; α = 0.05)

Sample ID	Day 28
CAMO 05 61156	175
CAMO 05 61157	174
CAMO 05 61158	175
CAMO 05 61159	174
CAMO 05 61160	175
CAMO 05 61161	175
CAMO 05 61162	174
CAALA 05 61183	175
Negative Control	175
POS 19.25	175
POS 38.5	136
POS 77	0

Weight of worms was measured at the beginning and at the conclusion of the 28-day exposure. Initial analysis of weights was confounded by the differences in starting weights among treatments.

Worms at starting were young adults (average weight per individual ranged from 0.314 to 0.442 g, with an overall mean weight of 0.367 g). Summary descriptive statistics and 1-Way ANOVA (both parametric and Kruskal-Wallis non-parametric) were run. The parametric 1-Way ANOVA is not valid as the starting weights were failed the Shapiro-Wilk test.

The Kruskal-Wallis non-parametric tests indicate statistically significant differences for starting weights, final weights, and purged weights, though not for the amount of mass purged. A plot of starting weights (figure 4) indicates steadily increasing starting weights for the following treatment groups: LAEW-Neg, LAEW4, LAEW8, LAEW7, LAEW6, and LAEW5.

Examination of patterns of weight loss by replicate (Figure 5, $R^2 = 0.83$) and by mean of treatment ($R^2 = 0.902$;Figure 6) indicated a strong inverse correlations between starting weight and weight lost. It may be informative to determine if the concentrations of CoC are correlated similarly with weight loss, though it suggests that the heavier animals were more susceptible to weight loss than the lighter animals and this may have nothing to do with CoC.

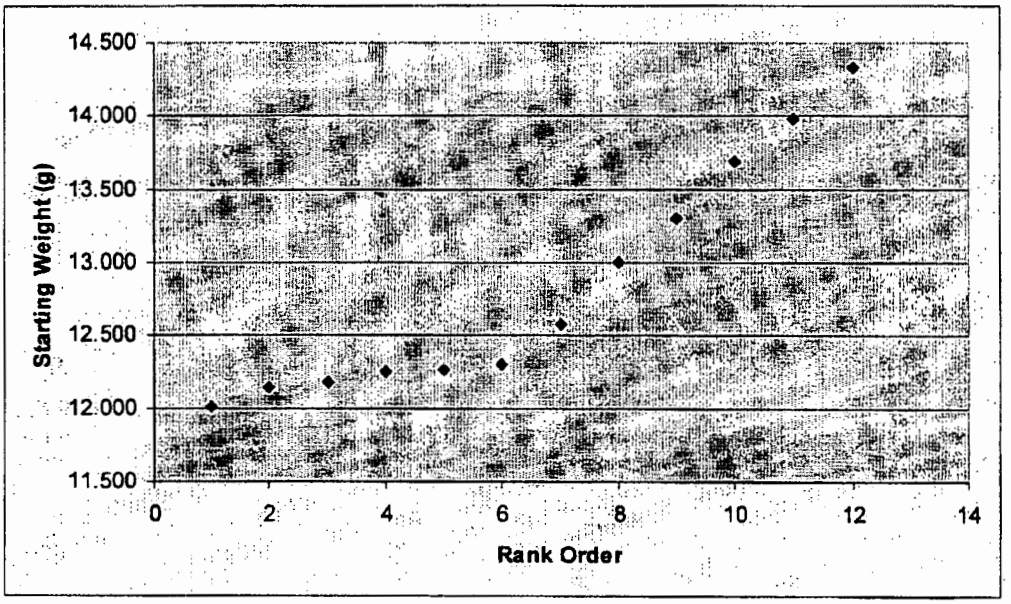

Figure 4. Rank order of starting weights by treatment.

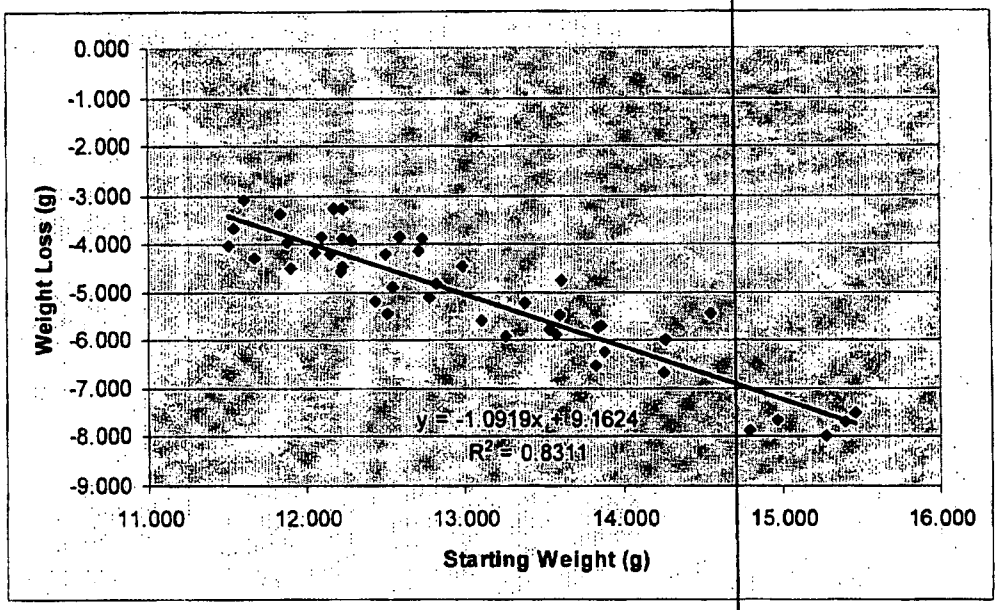

Figure 5. Correlation between starting weight (g) of worms and weight loss (g) during the test

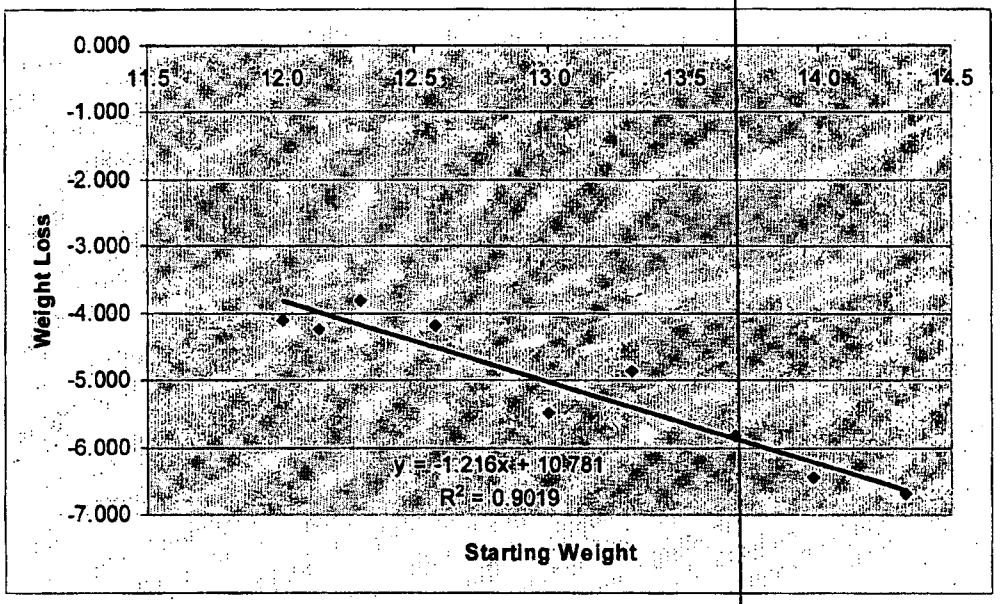

Figure 6. Correlation between mean treatment starting weight (g) of worms and weight loss (g) during the test.

Sequence of the rank order is: 1, LAEW1; 2, LAEW3; 3, LAEW-Pos1; 4, LAEW-Pos2; 5, LAEW-Pos3; 6, LAEW2; 7, LAEW-Neg; 8, LAEW4; 9, LAEW8; 10, LAEW7; 11, LAEW6; and 12, LAEW5.

In that the magnitude of weight loss was correlated strongly with initial weight (r^2 = 0.901), it was necessary to normalize the weight loss to the initial weight. Comparisons of normalized weights (i.e., expressing final weight as a percentage of starting weight), identified three groups according to Bonferroni comparison of means; samples CAMO 05 61160 (our sample 5) and CAMO 05 61161 (our sample 6) having the greatest weight loss and distinguishable from the other two groups (Table 8).

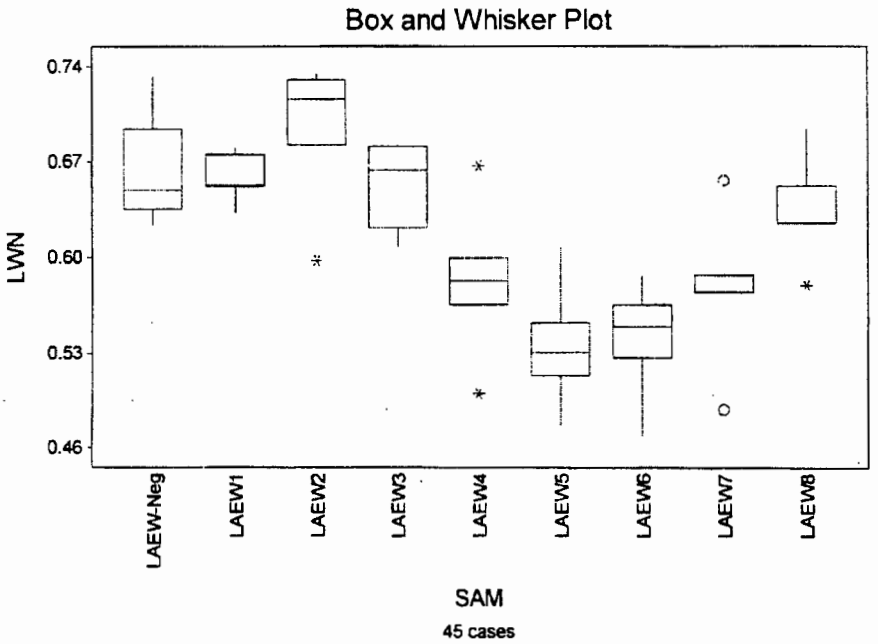

Figure 7. Box and Whisker plot of normalized weight loss (g) by treatment/sample. (Y-axis LWN = Live weight at takedown (g) normalized to initial weight (g). For X-axis labels refer to Table 1)

Table 8. One-Way Analysis of Variance (ANOVA) with Bonferroni comparison of means.

source	DF	SS	MS	F	P
between	8	0.13402	0.01675	7.43	0.0000
within	36	0.08115	0.00225		
total	44	0.21518			

	Chi-Sq	DF	P
Bartlett's Test Equal Variances	5.25	8	0.7308
Cochran's Q	0.1794		
Largest Var / Smallest Var	9.0919		

Bonferroni Comparison of Means

SAM	MEAN	GROUPS
LAEW2	0.6924	I
LAEW-Neg	0.6670	I I
LAEW1	0.6586	I I
LAEW3	0.6514	I I
LAEW8	0.6358	I I I
LAEW4	0.5830	I I
LAEW7	0.5762	I I
LAEW6	0.5394	I
LAEW5	0.5362	I

There are 3 groups in which the means are not significantly different from one another.

critical t value = 3.465 REJECTION LEVEL = 0.050

critical value for comparison = 0.1040

standard error for comparison = 0.0300

6. Conclusions

Performance of negative and positive controls as well as the test room environment being within guideline specifications, and so despite the problem of differential starting weights (all within specified weight ranges), the results of this test are valid for assessing acute mortality due to any constituents of concern in the test soils. Additional insights might be gleaned from comparisons of the results with analytical chemical information obtained from the sample splits analyzed for constituents of concern.

7. References

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8. Appendices

Appendix A. Test room environmental data

Table 1. Test room environmental data (Temperature in Celsius, Relative Humidity as Percentage)

Date	Min. Temp.	Max. Temp.	Mean Temp	Min. Humidity	Max. Humidity	Mean Humidity
24-Jul-05	21.4	21.8	21.6	45	52	59
25-Jul-05	21.5	22.0	21.7	46	51	61
26-Jul-05	21.4	22.1	21.7	45	53	56
27-Jul-05	21.4	22.1	21.8	42	52	58
28-Jul-05	21.4	22.1	21.8	41	55	63
29-Jul-05	21.4	22.2	21.8	41	51	64
30-Jul-05	21.5	22.1	21.8	40	47	64
31-Jul-05	21.5	22.1	21.8	42	45	53
1-Aug-05	21.5	22.1	21.9	39	47	48
2-Aug-05	21.6	22.2	21.9	39	47	70
3-Aug-05	21.4	22.0	21.9	38	50	65
4-Aug-05	21.4	22.2	21.8	41	51	60
5-Aug-05	21.5	22.1	21.8	39	53	62
6-Aug-05	21.4	22.2	21.9	38	46	61
7-Aug-05	21.5	22.2	21.9	35	45	64
8-Aug-05	21.4	22.1	21.8	38	47	58
9-Aug-05	21.5	22.1	21.7	40	48	49
10-Aug-05	21.4	22.1	21.7	41	50	49
11-Aug-05	21.4	22.2	21.7	39	49	50
12-Aug-05	21.5	22.1	21.7	42	53	53
13-Aug-05	21.5	22.1	21.7	40	56	51
14-Aug-05	21.6	22.2	21.8	42	55	53
15-Aug-05	21.6	22.1	21.9	45	53	60
16-Aug-05	21.5	22.1	21.7	45	54	52
17-Aug-05	21.6	22.2	21.9	42	53	56
18-Aug-05	21.5	22.2	21.9	45	56	53
19-Aug-05	21.6	22.2	21.9	43	57	51
20-Aug-05	21.6	22.0	21.8	49	54	52
21-Aug-05	21.5	22.1	21.7	44	53	49
22-Aug-05	21.4	22.0	21.7	45	50	47
23-Aug-05	21.4	22.0	21.7	41	51	46
24-Aug-05	21.6	21.9	21.6	45	57	50
Mean	21.5	22.1	21.8	41.8	51.3	55.8
Stdv	0.08	0.10	0.09	3.01	3.47	6.31

Min.	Max.
21.4	22.2

Min.	Max.
35.0	57.0

Table 2 – Light readings

Light Readings in Microeinsteins Measured at table surface	
A Row 1	43
A Row 5 and 6	53
A Row 10	45
B-C Row 1	45
B-C Row 5 and 6	56
B-C Row 10	46
D Row 1	42
D Row 5 and 6	55
D Row 10	44
E Row 1	50
E Row 5 and 6	59
E Row 10	48
Ave	49
Max	59
Min	42
St Dev	6

Appendix B. Test Data.

ID #	Lab Sample	Rep	Location	Client Sample Name
01	LAEW1	1	A06	CAMO 05 61156
02	LAEW1	2	F03	CAMO 05 61156
03	LAEW1	3	E04	CAMO 05 61156
04	LAEW1	4	B05	CAMO 05 61156
05	LAEW1	5	E09	CAMO 05 61156
06	LAEW2	1	B07	CAMO 05 61157
07	LAEW2	2	D05	CAMO 05 61157
08	LAEW2	3	C10	CAMO 05 61157
09	LAEW2	4	D01	CAMO 05 61157
10	LAEW2	5	E07	CAMO 05 61157
11	LAEW3	1	E05	CAMO 05 61158
12	LAEW3	2	D06	CAMO 05 61158
13	LAEW3	3	B02	CAMO 05 61158
14	LAEW3	4	E10	CAMO 05 61158
15	LAEW3	5	C06	CAMO 05 61158
16	LAEW4	1	C04	CAMO 05 61159
17	LAEW4	2	B10	CAMO 05 61159
18	LAEW4	3	A07	CAMO 05 61159
19	LAEW4	4	C09	CAMO 05 61159
20	LAEW4	5	D03	CAMO 05 61159
21	LAEW5	1	A04	CAMO 05 61160
22	LAEW5	2	F09	CAMO 05 61160
23	LAEW5	3	A10	CAMO 05 61160
24	LAEW5	4	A08	CAMO 05 61160
25	LAEW5	5	D07	CAMO 05 61160
26	LAEW6	1	A05	CAMO 05 61161
27	LAEW6	2	B09	CAMO 05 61161
28	LAEW6	3	C02	CAMO 05 61161
29	LAEW6	4	F01	CAMO 05 61161
30	LAEW6	5	A01	CAMO 05 61161
31	LAEW7	1	F06	CAMO 05 61162
32	LAEW7	2	A03	CAMO 05 61162
33	LAEW7	3	F07	CAMO 05 61162
34	LAEW7	4	F05	CAMO 05 61162
35	LAEW7	5	F10	CAMO 05 61162
36	LAEW8	1	C07	CAALA 05 61183
37	LAEW8	2	B01	CAALA 05 61183
38	LAEW8	3	A09	CAALA 05 61183

Start Data--NEPT 2005 WT

ID #	Lab Sample	Rep	Location	Client Sample Name
39	LAEW8	4	C08	CAALA 05 61183
40	LAEW8	5	F04	CAALA 05 61183
41	LAEW-Neg	1	C01	Negative Control
42	LAEW-Neg	2	B08	Negative Control
43	LAEW-Neg	3	D09	Negative Control
44	LAEW-Neg	4	F02	Negative Control
45	LAEW-Neg	5	E06	Negative Control
46	LAEW-Pos1	1	B03	POS 19.25
47	LAEW-Pos1	2	D02	POS 19.25
48	LAEW-Pos1	3	B06	POS 19.25
49	LAEW-Pos1	4	E01	POS 19.25
50	LAEW-Pos1	5	B04	POS 19.25
51	LAEW-Pos2	1	A02	POS 38.5
52	LAEW-Pos2	2	E03	POS 38.5
53	LAEW-Pos2	3	C05	POS 38.5
54	LAEW-Pos2	4	C03	POS 38.5
55	LAEW-Pos2	5	E02	POS 38.5
56	LAEW-Pos3	1	E08	POS 77
57	LAEW-Pos3	2	D10	POS 77
58	LAEW-Pos3	3	D08	POS 77
59	LAEW-Pos3	4	F08	POS 77
60	LAEW-Pos3	5	D04	POS 77

Setup pH Date	Lab Sample	Bulk pH 1	Bulk pH 2	Bulk pH 3	Bulk Antilog pH 1	Bulk Antilog pH 2	Bulk Antilog pH 3	Mean of Bulk Antilogs	Mean pH	Comments	Tech Initials
15-Jul-05	LAEW1	6.35	6.37	6.37	2.24E+06	2.34E+06	2.34E+06	2.31E+06	6.36		JY
15-Jul-05	LAEW2	7.24	7.31	7.27	1.74E+07	2.04E+07	1.86E+07	1.88E+07	7.27		JY
15-Jul-05	LAEW3	6.72	6.74	6.78	5.25E+06	5.50E+06	6.03E+06	5.59E+06	6.75		JY
15-Jul-05	LAEW4	6.77	6.71	6.78	5.89E+06	5.13E+06	6.03E+06	5.68E+06	6.75		JY
15-Jul-05	LAEW5	7.47	7.43	7.42	2.95E+07	2.69E+07	2.63E+07	2.76E+07	7.44		JY
15-Jul-05	LAEW6	6.51	6.47	6.52	3.24E+06	2.95E+06	3.31E+06	3.17E+06	6.50		JY
15-Jul-05	LAEW7	6.22	6.23	6.21	1.66E+06	1.70E+06	1.62E+06	1.66E+06	6.22		JY
15-Jul-05	LAEW8	5.56	5.50	5.54	3.63E+05	3.16E+05	3.47E+05	3.42E+05	5.53		JY
15-Jul-05	AEW-Neg	7.12	7.18	7.21	1.32E+07	1.51E+07	1.62E+07	1.48E+07	7.17		JY
15-Jul-05	AEW-Pos	7.19	7.15	7.18	1.55E+07	1.41E+07	1.51E+07	1.49E+07	7.17		JY
15-Jul-05	AEW-Pos	7.15	7.22	7.19	1.41E+07	1.66E+07	1.55E+07	1.54E+07	7.19		JY
15-Jul-05	AEW-Pos	7.13	7.20	7.19	1.35E+07	1.58E+07	1.55E+07	1.49E+07	7.17		JY

Tech Initial/Date SEE ABOVE QA Initial/Date

Computer Entry/Date Corrections/Date

Setup Soil pH's--NEPTUNE 2005 WT

ID #	Setup Date	Lab Sample	Rep	Empty Jar Weight (g)	(g) Soil Added	mL Water Added	Total Weight (g)	Comments	Tech Initials
1	22-Jul-05	LAEW1	1	434	606	203	1244		JY
2	22-Jul-05	LAEW1	2	420	606	203	1229		JY
3	22-Jul-05	LAEW1	3	432	606	203	1242		JY
4	22-Jul-05	LAEW1	4	434	606	203	1244		JY
5	22-Jul-05	LAEW1	5	434	606	203	1244		JY
6	22-Jul-05	LAEW2	1	471	635	175	1282		JY
7	22-Jul-05	LAEW2	2	434	635	175	1244		JY
8	22-Jul-05	LAEW2	3	441	635	175	1251		JY
9	22-Jul-05	LAEW2	4	435	635	175	1245		JY
10	22-Jul-05	LAEW2	5	434	635	175	1244		JY
11	22-Jul-05	LAEW3	1	433	608	202	1243		JY
12	22-Jul-05	LAEW3	2	434	608	202	1244		JY
13	22-Jul-05	LAEW3	3	442	608	202	1252		JY
14	22-Jul-05	LAEW3	4	434	608	202	1244		JY
15	22-Jul-05	LAEW3	5	437	608	202	1247		JY
16	22-Jul-05	LAEW4	1	433	661	149	1243		JY
17	22-Jul-05	LAEW4	2	433	661	149	1243		JY
~~18~~	~~22-Jul-05~~	~~LAEW4~~	~~3~~	~~420~~	~~661~~	~~149~~	~~1230~~		~~JY~~
19	22-Jul-05	LAEW4	4	435	661	149	1245		JY
20	22-Jul-05	LAEW4	5	436	661	149	1246		JY
21	22-Jul-05	LAEW5	1	441	612	197	1250		JY
22	22-Jul-05	LAEW5	2	435	612	197	1244		JY
23	22-Jul-05	LAEW5	3	434	612	197	1293		JY

Tech Initial/Date SEE ABOVE QA Initial/Date

Setup Data-NEPT 2005 WT

Computer Entry/Date liz 9/21/05 Corrections/Date

ID #	Setup Date	Lab Sample	Rep	Empty Jar Weight (g)	(g) Soil Added	mL Water Added	Total Weight (g)	Comments	Tech Initials
24	22-Jul-05	LAEW5	4	448	612	197	1257		JY
25	22-Jul-05	LAEW5	5	441	612	197	1250		JY
26	22-Jul-05	LAEW6	1	448	604	206	1258		JY
27	22-Jul-05	LAEW6	2	452	604	206	1262		JY
28	22-Jul-05	LAEW6	3	452	604	206	1262		JY
29	22-Jul-05	LAEW6	4	443	604	206	1253		JY
30	22-Jul-05	LAEW6	5	452	604	206	1262		JY
31	22-Jul-05	LAEW7	1	452	612	197	1261		JY
32	22-Jul-05	LAEW7	2	453	612	197	1262		JY
33	22-Jul-05	LAEW7	3	452	612	197	1261		JY
34	22-Jul-05	LAEW7	4	442	612	197	1251		JY
35	22-Jul-05	LAEW7	5	436	612	197	1245		JY
36	22-Jul-05	LAEW8	1	435	661	149	1245		JY
37	22-Jul-05	LAEW8	2	436	661	149	1246		JY
38	22-Jul-05	LAEW8	3	421	661	149	1261		JY
39	22-Jul-05	LAEW8	4	434	661	149	1244		JY
40	22-Jul-05	LAEW8	5	471	661	149	1281		JY
41	22-Jul-05	LAEW-Neg	1	432	612	197	1241		JY
42	22-Jul-05	LAEW-Neg	2	438	612	197	1247		JY
43	22-Jul-05	LAEW-Neg	3	473	612	197	1282		JY
44	22-Jul-05	LAEW-Neg	4	436	612	197	1245		JY
45	22-Jul-05	LAEW-Neg	5	441	612	197	1250		JY
46	22-Jul-05	LAEW-Pos1	1	435	612	197	1244		JY

Tech Initial/Date SEE ABOVE **QA Initial/Date**

Computer Entry/Date lIz 9/21/05 **Corrections/Date**

Setup Data-NEPT 2005 WT

ID #	Setup Date	Lab Sample	Rep	Empty Jar Weight (g)	(g) Soil Added	mL Water Added	Total Weight (g)	Comments	Tech Initials
47	22-Jul-05	LAEW-Pos1	2	441	612	197	1250		JY
48	22-Jul-05	LAEW-Pos1	3	435	612	197	1244		JY
49	22-Jul-05	LAEW-Pos1	4	475	612	197	1284		JY
50	22-Jul-05	LAEW-Pos1	5	432	612	197	1241		JY
51	22-Jul-05	LAEW-Pos2	1	420	612	197	1229		JY
52	22-Jul-05	LAEW-Pos2	2	436	612	197	1245		JY
53	22-Jul-05	LAEW-Pos2	3	433	612	197	1242		JY
54	22-Jul-05	LAEW-Pos2	4	436	612	197	1245		JY
55	22-Jul-05	LAEW-Pos2	5	472	612	197	1281		JY
56	22-Jul-05	LAEW-Pos3	1	434	612	197	1243		JY
57	22-Jul-05	LAEW-Pos3	2	437	612	197	1246		JY
58	22-Jul-05	LAEW-Pos3	3	441	612	197	1250		JY
59	22-Jul-05	LAEW-Pos3	4	436	612	197	1245		JY
60	22-Jul-05	LAEW-Pos3	5	436	612	197	1245		JY

Tech Initial/Date SEE ABOVE QA Initial/Date

Computer Entry/Date_liz 9/21/05 Corrections/Date

ID #	Start Date	Lab Sample	Rep	Location	Beginning Worm Count	Beginning Worm Weight (g)	Rep 1 Temp C	Comments	Tech Initials
01	23-Jul-05	LAEW1	1	A06	35	11.672	22.0		JY
02	23-Jul-05	LAEW1	2	F03	35	12.713			JY
03	23-Jul-05	LAEW1	3	E04	35	12.052			JY
04	23-Jul-05	LAEW1	4	B05	35	12.101			JY
05	23-Jul-05	LAEW1	5	E09	35	11.499			JY
06	23-Jul-05	LAEW2	1	B07	35	12.279	22.1		JY
07	23-Jul-05	LAEW2	2	D05	35	13.603			JY
08	23-Jul-05	LAEW2	3	C10	35	12.169			JY
09	23-Jul-05	LAEW2	4	D01	35	11.603			JY
10	23-Jul-05	LAEW2	5	E07	35	11.831			JY
11	23-Jul-05	LAEW3	1	E05	35	11.896	21.2		JY
12	23-Jul-05	LAEW3	2	D06	35	11.541			JY
13	23-Jul-05	LAEW3	3	B02	35	12.551			JY
14	23-Jul-05	LAEW3	4	E10	35	12.497			JY
15	23-Jul-05	LAEW3	5	C06	35	12.231			JY
16	23-Jul-05	LAEW4	1	C04	35	11.879	22.1		JY
17	23-Jul-05	LAEW4	2	B10	35	12.436			JY
18	23-Jul-05	LAEW4	3	A07	35	12.510			JY
19	23-Jul-05	LAEW4	4	C09	35	12.778			JY

Tech Initial/Date SEE_ABOVE QA Initial/Date

Computer Entry/Date_liz 9/21/05 Corrections/Date

Start Data--NEPTUNE 2005 WT

ID #	Start Date	Lab Sample	Rep	Location	Beginning Worm Count	Beginning Worm Weight (g)	Rep 1 Temp C	Comments	Tech Initials
20	23-Jul-05	LAEW4	5	D03	35	15.396			JY
21	23-Jul-05	LAEW5	1	A04	35	13.374	22.2		JY
22	23-Jul-05	LAEW5	2	F09	35	14.257			JY
23	23-Jul-05	LAEW5	3	A10	35	15.458			JY
24	23-Jul-05	LAEW5	4	A08	35	13.256			JY
25	23-Jul-05	LAEW5	5	D07	35	15.279			JY
26	23-Jul-05	LAEW6	1	A05	35	13.827	22.8		JY
27	23-Jul-05	LAEW6	2	B09	35	13.879			JY
28	23-Jul-05	LAEW6	3	C02	35	13.573			JY
29	23-Jul-05	LAEW6	4	F01	35	14.797			JY
30	23-Jul-05	LAEW6	5	A01	35	13.837			JY
31	23-Jul-05	LAEW7	1	F06	35	12.984	21.9		JY
32	23-Jul-05	LAEW7	2	A03	35	13.867			JY
33	23-Jul-05	LAEW7	3	F07	35	13.533			JY
34	23-Jul-05	LAEW7	4	F05	35	14.972			JY
35	23-Jul-05	LAEW7	5	F10	35	13.105			JY
36	23-Jul-05	LAEW8	1	C07	35	14.271	22.0		JY
37	23-Jul-05	LAEW8	2	B01	35	14.550			JY
38	23-Jul-05	LAEW8	3	A09	35	12.825			JY

Tech Initial/Date SEE ABOVE QA Initial/Date

Computer Entry/Date liz 9/21/05 Corrections/Date

Start Data--NEPTUNE 2005 WT

ID #	Start Date	Lab Sample	Rep	Location	Beginning Worm Count	Beginning Worm Weight (g)	Rep 1 Temp C	Comments	Tech Initials
39	23-Jul-05	LAEW8	4	C08	35	12.736			JY
40	23-Jul-05	LAEW8	5	F04	35	12.149			JY
41	23-Jul-05	LAEW-Neg	1	C01	35	12.233	22.5		JY
42	23-Jul-05	LAEW-Neg	2	B08	35	12.591			JY
43	23-Jul-05	LAEW-Neg	3	D09	35	12.231			JY
44	23-Jul-05	LAEW-Neg	4	F02	35	13.607			JY
45	23-Jul-05	LAEW-Neg	5	E06	35	12.218			JY
46	24-Jul-05	LAEW-Pos1	1	B03	35	11.369	22.3		JY
47	24-Jul-05	LAEW-Pos1	2	D02	35	13.272			JY
48	24-Jul-05	LAEW-Pos1	3	B06	35	10.994			JY
49	24-Jul-05	LAEW-Pos1	4	E01	35	12.587			JY
50	24-Jul-05	LAEW-Pos1	5	B04	35	12.659			JY
51	24-Jul-05	LAEW-Pos2	1	A02	35	12.704	21.8		JY
52	24-Jul-05	LAEW-Pos2	2	E03	35	11.736			JY
53	24-Jul-05	LAEW-Pos2	3	C05	35	11.682			JY
54	24-Jul-05	LAEW-Pos2	4	C03	35	12.509			JY
55	24-Jul-05	LAEW-Pos2	5	E02	35	12.647			JY
56	24-Jul-05	LAEW-Pos3	1	E08	35	11.037	21.9		JY
57	24-Jul-05	LAEW-Pos3	2	D10	35	12.099			JY

Tech Initial/Date SEE ABOVE QA Initial/Date

Start Data--NEPTUNE 2005 WT

Computer Entry/Date_liz 9/21/05 Corrections/Date

ID #	Start Date	Lab Sample	Rep	Location	Beginning Worm Count	Beginning Worm Weight (g)	Rep 1 Temp C	Comments	Tech Initials
58	24-Jul-05	LAEW-Pos3	3	D08	35	12.547			JY
59	24-Jul-05	LAEW-Pos3	4	F08	35	12.667			JY
60	24-Jul-05	LAEW-Pos3	5	D04	35	12.931			JY

Tech Initial/Date SEE ABOVE QA Initial/Date

Computer Entry/Date liz 9/21/05 Corrections/Date

Start Data--NEPTUNE 2005 WT

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

ay	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
7	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date _____

QA Initial/Date _____ Corrections/Date _____

Daily Obs. Sample LAEW1

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal and needs an appropriate commen

ay	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
7	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE
QA Initial/Date
Computer Entry/Date
Corrections/Date

Daily Obs. Sample LAEW2

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

Day	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
7	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date_____

QA Initial/Date_____ Corrections/Date_____

Daily Obs. Sample LAEW3

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

Day	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
7	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date_____

QA Initial/Date_____ Corrections/Date_____

Daily Obs. Sample LAEW4

An "X" or a checkmark signifies the rep is OK/Normal.
An "O" signifies the rep is Not OK/Abnormal; and needs an appropriate commen

ıy	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
'	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date_____

QA Initial/Date_____ Corrections/Date_____

Daily Obs. Sample LAEW5

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

ıy	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
7	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date

QA Initial/Date Corrections/Date

Daily Obs. Sample LAEW5

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

ıy	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
7	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date_____

QA Initial/Date_____ Corrections/Date_____

Daily Obs. Sample LAEW6

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

ıy	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
7	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date_____

QA Initial/Date_____ Corrections/Date_____

Daily Obs. Sample LAEW7

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

ıy	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
[illegible]	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

.ch Initial/Date SEE ABOVE Computer Entry/Date _____

QA Initial/Date _____ Corrections/Date _____

Daily Obs. Sample LAEW7

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

y	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date
QA Initial/Date Corrections/Date

Daily Obs. Sample LAEW8

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

y	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

.ch Initial/Date SEE ABOVE Computer Entry/Date_____ Daily Obs. Sample LAEW-Neg

QA Initial/Date_____ Corrections/Date_____

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

y	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

.ch Initial/Date SEE ABOVE Computer Entry/Date _____ aily Obs. Sample LAEW-Pos1

QA Initial/Date _____ Corrections/Date _____

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

y	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE
QA Initial/Date_____
Computer Entry/Date_____
Corrections/Date_____

Daily Obs. Sample LAEW-Pos2

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

y	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

ch Initial/Date SEE ABOVE Computer Entry/Date

QA Initial/Date Corrections/Date

Daily Obs. Sample LAEW-Pos2

An "X" or a checkmark signifies the rep is OK/Normal
An "O" signifies the rep is Not OK/Abnormal, and needs an appropriate commen

y	Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Comments	Tech Initials
1	23-Jul-05	X	X	X	X	X		JY
2	24-Jul-05	X	X	X	X	X		JY
3	25-Jul-05	X	X	X	X	X		JY
4	26-Jul-05	X	X	X	X	X		JY
5	27-Jul-05	X	X	X	X	X		JY
6	28-Jul-05	X	X	X	X	X		JY
7	29-Jul-05	X	X	X	X	X		JY
8	30-Jul-05	X	X	X	X	X		JY
9	31-Jul-05	X	X	X	X	X		JY
10	01-Aug-05	X	X	X	X	X		JY
11	02-Aug-05	X	X	X	X	X		JY
12	03-Aug-05	X	X	X	X	X		JY
13	04-Aug-05	X	X	X	X	X		JY
14	05-Aug-05	X	X	X	X	X		JY
15	06-Aug-05	X	X	X	X	X		JY
16	07-Aug-05	X	X	X	X	X		JY
	08-Aug-05	X	X	X	X	X		JY
18	09-Aug-05	X	X	X	X	X		JY
19	10-Aug-05	X	X	X	X	X		JY
20	11-Aug-05	X	X	X	X	X		JY
21	12-Aug-05	X	X	X	X	X		JY
22	13-Aug-05	X	X	X	X	X		JY
23	14-Aug-05	X	X	X	X	X		JY
24	15-Aug-05	X	X	X	X	X		JY
25	16-Aug-05	X	X	X	X	X		JY
26	17-Aug-05	X	X	X	X	X		JY
27	18-Aug-05	X	X	X	X	X		JY
28	19-Aug-05	X	X	X	X	X		JY

.ch Initial/Date SEE ABOVE Computer Entry/Date _____ aily Obs. Sample LAEW-Pos3

QA Initial/Date _____ Corrections/Date _____

ID #	Lab Sample Name	Rep	Takedown Worm Count	Takedown Worm Weight (g)	Takedown Cocoon Count	Rep 1 Temp C	Tech Initials	Takedown Worm Date	Comments
01	LAEW1	1	35	7.375		21.9	JY	20-Aug-05	egg juvenile
02	LAEW1	2	35	8.591			JY	20-Aug-05	egg juvenile
03	LAEW1	3	35	7.873			JY	20-Aug-05	egg juvenile
04	LAEW1	4	35	8.237			JY	20-Aug-05	egg juvenile
05	LAEW1	5	35	7.484			JY	20-Aug-05	egg juvenile
06	LAEW2	1	35	8.375		22.0	JY	20-Aug-05	egg juvenile
07	LAEW2	2	35	8.138			JY	20-Aug-05	egg juvenile
08	LAEW2	3	34	8.899			JY	20-Aug-05	egg juvenile
09	LAEW2	4	35	8.532			JY	20-Aug-05	egg juvenile
10	LAEW2	5	35	8.472			JY	20-Aug-05	egg juvenile
11	LAEW3	1	35	7.391		21.8	JY	20-Aug-05	egg juvenile
12	LAEW3	2	35	7.873			JY	20-Aug-05	egg juvenile
13	LAEW3	3	35	7.637			JY	20-Aug-05	egg juvenile
14	LAEW3	4	35	8.296			JY	20-Aug-05	egg juvenile
15	LAEW3	5	35	8.347			JY	20-Aug-05	few eggs, few juvenile
16	LAEW4	1	35	7.929		21.9	JY	20-Aug-05	few eggs, few juvenile
17	LAEW4	2	35	7.253			JY	20-Aug-05	few eggs, few juvenile
18	LAEW4	3	35	7.083			JY	20-Aug-05	few eggs, few juvenile
19	LAEW4	4	35	7.673			JY	20-Aug-05	few eggs, few juvenile
20	LAEW4	5	34	7.692			JY	20-Aug-05	few eggs, few juvenile
21	LAEW5	1	35	8.132		21.6	JY	20-Aug-05	few eggs, few juvenile
22	LAEW5	2	35	7.562			JY	20-Aug-05	few eggs, few juvenile
23	LAEW5	3	35	7.935			JY	20-Aug-05	few eggs, few juvenile

Tech Initial/Date SEE ABOVE QA Initial/Date

Takedown Worms--NEPT 2005 WT

Computer Entry/Date liz 9/21/05 Corrections/Date

ID #	Lab Sample Name	Rep	Takedown Worm Count	Takedown Worm Weight (g)	Takedown Cocoon Count	Rep 1 Temp C	Tech Initials	Takedown Worm Date	Comments
24	LAEW5	4	35	7.328			JY	20-Aug-05	few eggs, few juvenile
25	LAEW5	5	35	7.285			JY	20-Aug-05	few eggs, few juvenile
26	LAEW6	1	35	7.279		21.8	JY	20-Aug-05	few eggs, few juvenile
27	LAEW6	2	35	7.632			JY	20-Aug-05	few eggs, few juvenile
28	LAEW6	3	35	7.680			JY	20-Aug-05	few eggs, few juvenile
29	LAEW6	4	35	6.935			JY	20-Aug-05	few eggs, few juvenile
30	LAEW6	5	35	8.105			JY	20-Aug-05	few eggs, few juvenile
31	LAEW7	1	35	8.517		21.9	JY	20-Aug-05	egg juvenile
32	LAEW7	2	34	8.159			JY	20-Aug-05	egg juvenile
33	LAEW7	3	35	7.780			JY	20-Aug-05	egg juvenile
34	LAEW7	4	35	7.299			JY	20-Aug-05	egg juvenile
35	LAEW7	5	35	7.518			JY	20-Aug-05	egg juvenile
36	LAEW8	1	35	8.276		21.8	JY	20-Aug-05	egg juvenile
37	LAEW8	2	35	9.107			JY	20-Aug-05	egg juvenile
38	LAEW8	3	35	8.013			JY	20-Aug-05	egg juvenile
39	LAEW8	4	35	8.849			JY	20-Aug-05	egg juvenile
40	LAEW8	5	35	7.937			JY	20-Aug-05	egg juvenile
41	LAEW-Neg	1	35	8.957		22.1	JY	20-Aug-05	egg juvenile
42	LAEW-Neg	2	35	8.754			JY	20-Aug-05	egg juvenile
43	LAEW-Neg	3	35	7.769			JY	20-Aug-05	egg juvenile
44	LAEW-Neg	4	35	8.837			JY	20-Aug-05	egg juvenile
45	LAEW-Neg	5	35	7.629			JY	20-Aug-05	egg juvenile
46	LAEW-Pos1	1	35	8.155		22.0	JY	20-Aug-05	egg juvenile

Tech Initial/Date SEE ABOVE QA Initial/Date _____ **Takedown Worms--NEPT 2005 WT**

Computer Entry/Date liz 9/21/05 _____ Corrections/Date _____

ID #	Lab Sample Name	Rep	Takedown Worm Count	Takedown Worm Weight (g)	Takedown Cocoon Count	Rep 1 Temp C	Tech Initials	Takedown Worm Date	Comments
47	LAEW-Pos1	2	35	8.597			JY	20-Aug-05	egg juvenile
48	LAEW-Pos1	3	35	7.815			JY	20-Aug-05	egg juvenile
49	LAEW-Pos1	4	35	7.086			JY	20-Aug-05	egg juvenile
50	LAEW-Pos1	5	35	7.432			JY	20-Aug-05	egg juvenile
51	LAEW-Pos2	1	29	7.013			JY	20-Aug-05	egg juvenile
52	LAEW-Pos2	2	28	7.106			JY	20-Aug-05	egg juvenile
53	LAEW-Pos2	3	25	6.860			JY	20-Aug-05	egg juvenile
54	LAEW-Pos2	4	29	6.888			JY	20-Aug-05	egg juvenile
55	LAEW-Pos2	5	25	6.943			JY	20-Aug-05	egg juvenile
56	LAEW-Pos3	1	0	0.000			JY	20-Aug-05	
57	LAEW-Pos3	2	0	0.000			JY	20-Aug-05	
58	LAEW-Pos3	3	0	0.000			JY	20-Aug-05	
59	LAEW-Pos3	4	0	0.000			JY	20-Aug-05	
60	LAEW-Pos3	5	0	0.000			JY	20-Aug-05	

Tech Initial/Date SEE ABOVE QA Initial/Date

Computer Entry/Date lz 9/21/05 Corrections/Date

Takedown Worms--NEPT 2005 WT

Takedown pH Date	Lab Sample	Rep	pH 1	pH 2	pH 3	Antilog pH 1	Antilog pH 2	Antilog pH 3	Mean of Antilogs	Mean pH	Comments	Tech Initials
21-Aug-05	LAEW1	1	6.45	6.47	6.42	2.82E+06	2.95E+06	2.63E+06	2.80E+06	6.45		JMY
21-Aug-05	LAEW2	1	7.34	7.37	7.39	2.19E+07	2.34E+07	2.45E+07	2.33E+07	7.37		JMY
21-Aug-05	LAEW3	1	6.81	6.83	6.85	6.46E+06	6.76E+06	7.08E+06	6.77E+06	6.83		JMY
21-Aug-05	LAEW4	1	3.85	6.82	6.87	7.08E+03	6.61E+06	7.41E+06	4.68E+06	6.67		JMY
21-Aug-05	LAEW5	1	7.54	7.51	7.55	3.47E+07	3.24E+07	3.55E+07	3.42E+07	7.53		JMY
21-Aug-05	LAEW6	1	6.63	6.65	6.67	4.27E+06	4.47E+06	4.68E+06	4.47E+06	6.65		JMY
21-Aug-05	LAEW7	1	6.35	6.32	6.37	2.24E+06	2.09E+06	2.34E+06	2.22E+06	6.35		JMY
21-Aug-05	LAEW8	1	5.71	5.68	5.75	5.13E+05	4.79E+05	5.62E+05	5.18E+05	5.71		JMY
21-Aug-05	AEW-Ne	1	7.23	7.21	7.26	1.70E+07	1.62E+07	1.82E+07	1.71E+07	7.23		JMY
21-Aug-05	AEW-Pos	1	7.27	7.25	7.28	1.86E+07	1.78E+07	1.91E+07	1.85E+07	7.27		JMY
21-Aug-05	AEW-Pos	1	7.29	7.25	7.29	1.95E+07	1.78E+07	1.95E+07	1.89E+07	7.28		JMY
21-Aug-05	AEW-Pos	1	7.25	7.29	7.25	1.78E+07	1.95E+07	1.78E+07	1.84E+07	7.26		JMY

Tech Initial/Date SEE ABOVE QA Initial/Date _____ akedown Soil pH's--NEPTUNE WT

Computer Entry/Date _____ Corrections/Date _____

All Weights and Amounts in Grams

Takedown SMF Date	Lab Sample Name	Boat Weight	Boat + Wet Soil Weight	Wet Soil Weight	Boat + Dry Soil Weight	Dry Soil Weight	Soil Moisture Fraction	Comments	Tech Initials
23-Aug-05	LAEW1	1.624	26.723	25.099	17.723	16.099	0.559		JY
23-Aug-05	LAEW2	1.620	26.535	24.915	19.271	17.651	0.412		JY
23-Aug-05	LAEW3	1.622	26.631	25.009	18.492	16.870	0.482		JY
23-Aug-05	LAEW4	1.627	26.793	25.166	19.224	17.597	0.430		JY
23-Aug-05	LAEW5	1.610	26.632	25.022	18.576	16.966	0.475		JY
23-Aug-05	LAEW6	1.622	26.613	24.991	18.637	17.015	0.469		JY
23-Aug-05	LAEW7	1.624	26.718	25.094	19.699	18.075	0.388		JY
23-Aug-05	LAEW8	1.624	26.650	25.026	18.775	17.151	0.459		JY
23-Aug-05	LAEW-Neg	1.628	26.679	25.051	19.101	17.473	0.434		JY
23-Aug-05	LAEW-Pos1	1.625	26.496	24.871	17.922	16.297	0.526		JY
23-Aug-05	LAEW-Pos2	1.622	26.661	25.039	17.637	16.015	0.563		JY
23-Aug-05	LAEW-Pos3	1.625	26.627	25.002	17.843	16.218	0.542		JY

Tech Initial/Date SEE ABOVE QA Initial/Date

Computer Entry/Date Corrections/Date

Takedown SMF NEPT 2005 WT

Appendix C. Statistical summaries.

Bonferroni Comparison Of Means Of Lwn By Sample - Homogeneous

SAMPLE	MEAN	GROUPS
LAEW2	0.6924	I
LAEW-Neg	0.6670	II
LAEW1	0.6586	II
LAEW3	0.6514	II
LAEW8	0.6358	III
LAEW4	0.5830	II
LAEW7	0.5762	II
LAEW6	0.5394	I
LAEW5	0.5362	I

There are 3 groups in which the means are not significantly different from one another.
Critical t value 3.465 rejection level 0.050
Critical value for comparison 0.1040
Standard error for comparison 0.0300

One-Way AOV For Lwn By Sample

SOURCE	DF	SS	MS	F	P
BETWEEN	8	0.13402	0.01675	7.43	0.0000
WITHIN	36	0.08115	0.00225		
TOTAL	44	0.21518			

CHI-SQ	DF	P	
Bartlett's test of equalvariances	5.25	8	0.7308

Cochran's Q 0.1794
Largest Var / Smallest Var 9.0919
Component of variance for between groups 0.00290
Effective cell size 5.0

SAMPLE	MEAN	SAMPLE SIZE	GROUP STD DEV
LAEW-Neg	0.6670	5	0.0453
LAEW1	0.6586	5	0.0200
LAEW2	0.6924	5	0.0567
LAEW3	0.6514	5	0.0348
LAEW4	0.5830	5	0.0603
LAEW5	0.5362	5	0.0488
LAEW6	0.5394	5	0.0451
LAEW7	0.5762	5	0.0598
LAEW8	0.6358	5	0.0422
TOTAL	0.6156	45	0.0475

Cases Included 45
Missing Cases 0

Kruskal-Wallis One-Way Nonparametric Aov For P_Wt By Lab_ID

LAB_ID	MEAN RANK	SAMPLE SIZE
LAEW-Neg	33.2	5
LAEW1	20.6	5
LAEW2	34.6	5
LAEW3	22.8	5
LAEW4	11.7	5
LAEW5	14.9	5
LAEW6	15.2	5
LAEW7	20.8	5
LAEW8	33.2	5
TOTAL	23.0	45

Kruskal-Wallis Statistic 17.6075
P-value, using Chi-Squared Approximation 0.0244

Parametric AOV Applied To Ranks

SOURCE	DF	SS	MS	F	P
BETWEEN	8	3037.10	379.638	3.00	0.0110
WITHIN	36	4552.40	126.456		
TOTAL	44	7589.50			

Total number of values that were tied 2
Max. Diff. Allowed between ties 0.00001

Cases included 45 missing cases 0

Descriptive Statistics For Lab_ID = LAEW-Neg

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	8.3892	-4.1868	0.3502	8.0390
SD	0.6361	0.6184	0.1134	0.6340
C.V.	7.5825	14.770	32.387	7.8868
MINIMUM	7.6290	-4.7700	0.2500	7.2360
MAXIMUM	8.9570	-3.2760	0.5280	8.6860
SKEW	-0.3871	0.6077	0.7905	-0.2896
KURTOSIS	-1.7713	-1.1818	-0.8362	-1.6027

Descriptive Statistics For Lab_ID = LAEW1

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	7.9120	-4.0954	0.4844	7.4276
SD	0.5098	0.1646	0.0732	0.5370
C.V.	6.4439	4.0187	15.121	7.2295
MINIMUM	7.3750	-4.2970	0.4050	6.9360
MAXIMUM	8.5910	-3.8640	0.5820	8.1330
SKEW	0.2406	0.2579	0.3351	0.3323
KURTOSIS	-1.4255	-1.0365	-1.4425	-1.5459

Descriptive Statistics For Lab_ID = LAEW2

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	8.4832	-3.8138	0.4530	8.0302
SD	0.2767	0.9733	0.0976	0.2671
C.V.	3.2618	25.519	21.554	3.3262
MINIMUM	8.1380	-5.4650	0.3250	7.7580
MAXIMUM	8.8990	-3.0710	0.5630	8.3910
SKEW	0.3905	-1.1636	-0.2829	0.3202
KURTOSIS	-0.6421	-0.2595	-1.4388	-1.4230

Descriptive Statistics For Lab_ID = LAEW3

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	7.9088	-4.2344	0.4040	7.5048
SD	0.4139	0.4949	0.0475	0.4213
C.V.	5.2333	11.688	11.770	5.6133
MINIMUM	7.3910	-4.9140	0.3560	6.9220
MAXIMUM	8.3470	-3.6680	0.4690	7.9360
SKEW	-0.0661	-0.2511	0.2145	-0.2986
KURTOSIS	-1.5443	-1.2465	-1.3216	-1.3089

Descriptive Statistics For Lab_ID = LAEW4

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	7.5220	-5.4778	0.4226	7.0994
SD	0.3537	1.3709	0.0614	0.3360
C.V.	4.7021	25.026	14.537	4.7326
MINIMUM	7.0630	-7.7040	0.3360	6.6560
MAXIMUM	7.9290	-3.9500	0.5010	7.4280
SKEW	-0.2552	-0.8017	-0.1627	-0.3731
KURTOSIS	-1.4341	-0.3421	-0.9086	-1.5442

Descriptive Statistics For Lab_ID = LAEW5

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	7.6484	-6.6764	0.3948	7.2536
SD	0.3736	1.1259	0.0514	0.4100
C.V.	4.8842	16.864	13.010	5.6523
MINIMUM	7.2850	-7.9940	0.3450	6.8110
MAXIMUM	8.1320	-5.2420	0.4740	7.7710
SKEW	0.2955	0.0933	0.6992	0.1618
KURTOSIS	-1.5641	-1.4298	-0.8884	-1.5417

Descriptive Statistics For Lab_ID = LAEW6

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	7.5262	-6.4564	0.3220	7.2042
SD	0.4417	0.8471	0.0700	0.5005
C.V.	5.8692	13.120	21.734	6.9477
MINIMUM	6.9350	-7.8620	0.2120	6.5770
MAXIMUM	8.1050	-5.7320	0.3860	7.8930
SKEW	-0.0746	-1.0162	-0.8084	0.1252
KURTOSIS	-1.0398	-0.4012	-0.8207	-1.0566

Descriptive Statistics For Lab_ID = LAEW7

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	7.8546	-5.8376	0.3682	7.4864
SD	0.4896	1.1548	0.0616	0.5189
C.V.	6.2338	19.782	16.735	6.9306
MINIMUM	7.2990	-7.6730	0.3040	6.8670
MAXIMUM	8.5170	-4.4670	0.4330	8.1620
SKEW	0.2590	-0.6516	0.1561	0.1898
KURTOSIS	-1.3186	-0.3848	-1.7407	-1.3572

Descriptive Statistics For Lab_ID = LAEW8

	F_WT	L_WT	PURG	P_WT
N	5	5	5	5
MEAN	8.4364	-4.8698	0.4496	7.9868
SD	0.5183	0.8655	0.1274	0.3933
C.V.	6.1430	17.773	28.329	4.9250
MINIMUM	7.9370	-5.9950	0.3150	7.5970
MAXIMUM	9.1070	-3.8870	0.6020	8.5050
SKEW	0.3358	-0.1633	0.1334	0.3741
KURTOSIS	-1.5868	-1.4236	-1.6461	-1.5459

Kruskal-Wallis One-Way Nonparametric AOV For S_Wt By Lab_Id

LAB_ID	MEAN RANK	SAMPLE SIZE
LAEW-Neg	18.9	5
LAEW1	8.8	5
LAEW2	13.4	5
LAEW3	12.1	5
LAEW4	22.0	5
LAEW5	36.6	5
LAEW6	35.6	5
LAEW7	32.2	5
LAEW8	27.4	5
TOTAL	23.0	45

Kruskal-Wallis Statistic 25.4550
P-value, using Chi-Squared Approximation 0.0013

Parametric AOV Applied To Ranks

SOURCE	DF	SS	MS	F	P
BETWEEN	8	4390.70	548.838	6.18	0.0001
WITHIN	36	3198.80	88.8556		
TOTAL	44	7589.50			

Total number of values that were tied 2
Max. Diff. Allowed between ties 0.00001

Cases included 45 missing cases 0

One-Way Aov For F_Wt By Lab_Id

SOURCE	DF	SS	MS	F	P
BETWEEN	8	5.88939	0.73617	3.52	0.0042
WITHIN	36	7.52217	0.20895		
TOTAL	44	13.4116			

BARTLETT'S TEST OF EQUAL VARIANCES	CHI-SQ	DF	P
	3.37	**8**	**0.9092**

COCHRAN'S Q 0.2152
LARGEST VAR/SMALLEST VAR 5.2848

Component Of Variance For Between Groups 0.10544
Effective Cell Size 5.0

LAB_ID	SAMPLE MEAN	GROUP SIZE	STD DEV
LAEW-Neg	8.3892	5	0.6361
LAEW1	7.9120	5	0.5098
LAEW2	8.4832	5	0.2767
LAEW3	7.9088	5	0.4139
LAEW4	7.5220	5	0.3537
LAEW5	7.6484	5	0.3736
LAEW6	7.5262	5	0.4417
LAEW7	7.8546	5	0.4896
LAEW8	8.4364	5	0.5183
TOTAL	7.9645	45	0.4571

Cases Included 45 Missing Cases 0