FILE 080805
COPY 123-1b

MRID No. 410359-03

DATA EVALUATION RECORD

1. **CHEMICAL:** Prometryn.
   Shaughnessy No. 080805.

2. **TEST MATERIAL:** Prometryn (technical grade); 2,4-bis(isopropylamino)-6-(methylthio)-s-triazine; Sample No: FL-870991; CAS Registry No: 7287-19-6; 98.1% active ingredient; a white, crystalline solid.

   guide = 123-1(b)

3. **STUDY TYPE:** Vegetative Vigor Nontarget Phytotoxicity Test - Tier 2. Species Tested: Soybean, Lettuce, Carrot, Tomato, Cucumber, Cabbage, Oat, Perennial Ryegrass, Corn, and Onion.

4. **CITATION:** Canez, V.M. 1988. Prometryn: Tier 2 Vegetative Vigor Nontarget Phytotoxicity Study. Laboratory Study No. LR88-13A. Conducted by Pan-Agricultural Laboratories, Inc., Madera, CA. Submitted by CIBA-GEIGY Corporation, Greensboro, NC. MRID No. 410359-03.

5. **REVIEWED By:**

   Judy Awong, Ph.D.
   Staff Scientist
   KBN Engineering and
   Applied Sciences, Inc.

   Signature: Judy Awong
   Date: 6/24/90

6. **APPROVED BY:**

   Pim Kosalwat, Ph.D.
   Senior Scientist
   KBN Engineering and
   Applied Sciences, Inc.

   Signature: P. Kosalwat
   Date: 6/28/90

   Henry T. Craven, M.S.
   Supervisor, EEB/HED
   USEPA

   Signature: Richard C. Petrie 5/8/91
   Date: Charles Lewis 5/10/91

18 hrs

2028317

7. CONCLUSIONS: The study was conducted in a scientifically sound manner and fulfills the guideline requirements for a Tier 2 vegetative vigor phytotoxicity test using non-target plants. Some inconsistencies were observed between the reviewer's and the author's statistical analyses. These differences, however, did not affect the validity of the study.

   NOEC values for lettuce and cucumber were <0.013 and 0.019 lb ai/A, respectively. The NOEC values for tomato and cabbage were 0.05 lb ai/A, while the values for soybean and onion were 0.1 lb ai/A. The NOEC values for carrot, oat, and corn were 0.8 lb/A, while the NOEC for ryegrass was 1.6 lb ai/A, the highest concentration tested. Except for oat, the EC25 and EC50 values for all plant species were <1.6 lb ai/A prometryn, the maximum concentration tested. The EC25 and EC50 values of all plant species were also less than the maximum application rate (2.75 lb ai/A) for prometryn.

8. RECOMMENDATIONS: Based on the results of the study, a Tier 3 study is recommended.

9. BACKGROUND:

10. DISCUSSION OF INDIVIDUAL TESTS: N/A.

11. MATERIALS AND METHODS:

   A. Test Plants: Dicotyledon plants are represented by soybean, lettuce, carrot, tomato, cucumber, and cabbage. Monocotyledon plants are represented by corn, oats, ryegrass, and onion. Cultivars, lot number, source, and germination ratings were provided in the report.

   B. Test System: Seeds of each crop were planted in plastic pots (Com-Pack M1725, Black, 7.5 x 7.5 x 6.0 cm) filled with Supersoil, a pasteurized potting soil comprised of fir bark, redwood, Canadian peat, and sand. An analysis of the soil was provided in the report. A plexiglass template was used to create planting holes in the soil, thus allowing for uniform planting depth and seed distribution.

      Soybean and corn were planted at a depth of 2.5 cm, while the remaining eight species were planted at a depth of 1.3 cm. After planting, the pots were placed outdoors on a bench and covered with bird netting. Seedlings were allowed to grow to the appropriate stage of growth (1-3 true leaves). Prior to treatment, each

pot was thinned to five plants of uniform height and stage of growth.

The test spray solution was prepared by dissolving 757.3 mg prometryn in 184 ml of water and 9.7 ml acetone. Serial dilutions were made of the maximum solution to achieve the lower application rates. A belt sprayer equipped with a single TeeJet 8001-E nozzle was used to apply a single treatment. A nozzle height of 12 inches and a nozzle pressure of 46 psi were used to achieve a spray swath of 20 inches.

Specific study parameters such as photoperiod, temperature, relative humidity and irrigation schedules were included in the report.

C. Dosage: Prometryn was applied at the rates of 0, 0.1, 0.2, 0.4, 0.8, and 1.6 lb ai/A to all ten plant species. An additional treatment of prometryn was applied to cucumber at the rate of 0, 0.019, 0.038, 0.075, 0.15, and 0.3 lb ai/A to determine a no-effect level. Further treatments were later required for tomato, lettuce, cucumber, and cabbage to determine a no-effect level. Tomato, cabbage, and lettuce were treated at the rates of 0, 0.013, 0.025, 0.05, 0.10, and 0.20 lb ai/A. Cucumber was treated again at the rates of 0, 0.002, 0.004, 0.008, 0.015, and 0.03 lb ai/A. Treatment application rates were calculated on the percent active ingredient of the technical material (i.e., 98.1% ai).

D. Design: Each crop/treatment combination was replicated three times (10 seeds/pot, 3 pots/treatment level). After treatment, the pots were randomized within crops and among treatments and placed in a greenhouse. Seedling height was recorded prior to treatment and 21 days after treatment. Phytotoxicity ratings were recorded at 7, 14, and 21 days after treatment. Twenty-one days after treatment, the plants within treatment replicates (pots) were cut at soil level and dried in a pre-weighed paper bag at 70°C for a minimum of 48 hours. After drying, the dry weight of the plant material was recorded.

Plant height was measured by extending the seedling to its maximum height and recording the height to the nearest millimeter. The mean plant height was calculated for each treatment. The phytotoxicity ratings evaluated five observable toxic effects: 0-indicates no effect; 1-indicates slight plant effect;

2-indicates a moderate effect, e.g., mild stunting or chlorosis; 3-indicates a severe effect; and 4-indicates a total effect or plant death.

E. Statistics: Percent detrimental effect was calculated using the following equation:

$$\% \text{ effect} = \frac{(\text{treatment mean} - \text{control mean})}{\text{control mean}} \times 100$$

The percent increase in height from day-0 reading was calculated using the following equation:

$$\% \text{ increase} = \frac{(\text{day-21 mean}) - (\text{day-0 mean})}{\text{day-0 mean}} \times 100$$

The percent effect on growth was calculated for each treatment using the following equation:

$$\% \text{ effect} = \frac{(\text{treatment \% increase} - \text{control \% increase})}{\text{control \% increase}} \times 100$$

A one-way analysis of variance model for data with equal subsamples was used to analyze the data. The percent detrimental effect values on each replicate mean were input into an MSTAT probit analysis procedure to calculate EC values.

12. REPORTED RESULTS: Table A (attached) lists the NOEC, EC25, and EC50 values, along with the parameters in which these concentrations were observed. Detailed results for each specific parameter are described below.

Phytotoxicity rating: Table 19 (attached) summarizes the NOEC values of prometryn for mean phytotoxicity rating. Results showed that cucumber was the most sensitive crop tested to prometryn based on the statistical no-effect levels of the 21 day phytotoxicity ratings. Cucumber had a no-effect concentration of 0.03 lb ai/A of prometryn and a 0.3 mean phytotoxicity rating at that concentration. Treatment of oat and ryegrass with prometryn at a concentration of 0.16 lb ai/A did not result in a significant effect ($p < 0.05$) on day-21 mean phytotoxicity ratings. Since 1.6 lb ai/A was the highest concentration tested, the no-effect concentration is equal to or greater than 1.6 lb ai/A. Crops listed (with NOEC, lb ai/A) in order of increasing sensitivity to prometryn based on phytotoxicity rating NOEC values, are as follows:

oat = ryegrass ($\geq$ 1.6) < corn = carrot (0.8) < onion (0.4) <

cabbage = lettuce = soybean (0.2) < tomato (0.1) < cucumber (0.03)

Plant height: Table 20 (attached) summarizes the NOEC, EC25 and EC50 of prometryn on plant height. Treatment of lettuce, cucumber, and onion with prometryn at a concentration of 1.6 lb ai/A resulted in the death of many of the treated plants. Based on the results, cucumber had the lowest no-effect concentration of all plants tested. Cucumber had a no-effect level of 0.019 lb ai/A. Treatment of carrot, oat, and ryegrass plants at the maximum treatment concentration of 1.6 lb ai/A did not result in a significant effect ($p < 0.05$) on plant height at test termination (21 days). Plant species listed (with NOEC, lb ai/A) in order of increasing sensitivity to prometryn, based on plant height NOEC values, are as follows:

oat = ryegrass = carrot ($\geq$ 1.6) < corn (0.8) < onion (0.4) < cabbage = lettuce = soybean (0.2) < tomato (0.1) < cucumber (0.019)

All plant species except carrot, oat and ryegrass exhibited a plant height dose-response relationship. The lack of a dose response curve did not permit probit analysis of the percent effect levels in these plants species. Crops listed (with EC50, lb ai/A) in order of increasing sensitivity to prometryn, based on plant height EC50 values, are as follows:

corn (1.15) < soybean (0.534) < cabbage (0.4) < onion (0.348) < tomato (0.178) < cucumber (0.066) < lettuce (0.048)

Plant dry weight: The NOEC, EC25, and EC50 of prometryn for plant dry weight are summarized in Table 21 (attached). Treatment of carrot and ryegrass with prometryn did not result in a significant effect ($p < 0.05$) on plant dry weight, regardless of treatment concentration. Results of the remaining plant species showed lettuce was the most sensitive plant species to prometryn, based on the statistical no-effect level for lettuce dry weight. Plant species listed (with NOEC, lb ai/A) in order of increasing sensitivity to prometryn, based on dry weight NOEC values, are as follows:

carrot = ryegrass ($\geq$ 1.6) < corn = oat (0.8) < tomato (0.2) < soybean = onion (0.1) < cabbage (0.05) < cucumber (0.03)

The lack of a dose response curve in carrot and ryegrass did not allow for a probit analysis of the data. Plants listed

(with EC50, lb ai/A) in order of increasing sensitivity to prometryn, based on dry weight EC50 values, are as follows:

oat (2.66) < corn (1.15) < soybean (0.453) < onion (0.326) < cabbage (0.223) < tomato (0.214) < cucumber (0.028) < lettuce (0.022)

13. STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES: No conclusions were stated by the author. The study was inspected by the Quality Assurance Unit of Pan-Agricultural Labs, Inc. on several occasions to assure compliance with Good Laboratory Practice (GLP) Standards.

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

A. Test Procedure: The test procedures followed the SEP and Subdivision J guidelines. No major discrepancies were observed in the test procedures. The following minor discrepancies were observed in the report:

o The NOEC value for lettuce based on phytotoxicity ratings is given as 0.2 lb ai/A in Table 19 (attached). However, analysis of the statistical data in Table 1 (attached) indicates that the NOEC value for lettuce is 0.025 lb ai/A. The reviewer's statistical analyses also indicate that the NOEC value should be 0.025 lb ai/A (attached). The mean phytotoxicity rating at this concentration of prometryn is 0.3.

o The NOEC value for lettuce based on plant height data is given as 0.2 lb ai/A in Table 20 (attached). However, analysis of the statistical data in Table 7 (attached) indicates that the NOEC value for lettuce is 0.025 lb ai/A.

B. Statistical Analysis: Statistical analyses were conducted by the reviewer for selected species and parameters using the analysis of variance with Tukey's and Dunnett's tests (attached). The results were in general agreement with those presented by the author except for the following discrepancies:

o Differences were observed between the reviewer's and the author's statistical NOEC values for tomato based on phytotoxicity data. The reviewer's NOEC value for tomato was 0.05 lb ai/A (attached), whereas the author's NOEC value was 0.1 lb ai/A (Table 19). The reviewer's calculated mean phytotoxicity rating at the NOEC value of 0.05 lb ai/A is 0.1.

o Differences were observed between the reviewer's and the author's statistical NOEC values for cucumber based on plant dry weight data. The reviewer's NOEC value for cucumber was 0.02 lb ai/A (attached), whereas the author's NOEC value was 0.03 lb ai/A (table 21).

o In Table A, the author lists the NOEC value of ryegrass as $\geq$ 1.6 lb ai/A. Since no effect (all parameters) was observed at 1.6 lb ai/A, the highest concentration tested, the authors conclude that the actual no-effect concentration may be equal to or greater than 1.6 lb ai/A. However, statistical results give no indication that the NOEC value is actually greater than 1.6 lb ai/A. The reviewer recommends that the NOEC for ryegrass be listed as 1.6 lb ai/A.

EC25 and EC50 values for selected species were calculated by the reviewer using a Lotus 1-2-3 regression analysis (attached). The results were in general agreement with those presented by the author.

C. **Discussion/Results**: This study is considered to be scientifically valid. Treatment with the maximum concentration of 1.6 lb ai/A resulted in a significant effect ($p < 0.05$) on the 21 day mean phytotoxicity rating of all crops except oat and ryegrass. Treatment with the maximum concentration (1.6 lb ai/A) also resulted in a significant effect ($p < 0.05$) on plant height of all crops except oat, ryegrass, and carrot. Similarly, significant effects ($p < 0.05$) were observed on plant dry weight of all crops except carrot and rye grass at the maximum treatment concentration. Ryegrass was the least sensitive plant species to prometryn while lettuce was the most sensitive.

Based on the author's and the reviewer's statistical analyses, the NOEC values for lettuce and cucumber were <0.013 and 0.019 lb ai/A, respectively, (Table A). The NOEC values for tomato and cabbage were 0.05 lb ai/A, while the values for soybean and onion were 0.1 lb ai/A. The NOEC values for carrot, oat, and corn were 0.8 lb/A, while the NOEC for ryegrass was 1.6 lb ai/A, the highest concentration tested. Except for oat, carrot, and ryegrass, the EC25 and EC50 values for all plant species were <1.6 lb ai/A prometryn, the maximum concentration tested. The EC25 and EC50 values of all plant species were also less than the maximum application rate (2.75 lb ai/A) for prometryn. Based on the study results, a Tier 3 study is required.

D. Adequacy of the Study:

(1) Classification: Core.

(2) Rationale: Although differences were observed between the reviewer's and the author's statistical analyses, these differences did not affect the general validity of the study.

(3) Repairability: N/A.

15. COMPLETION OF ONE-LINER: N/A.

Table A.

The following table lists the lowest observed no-effect concentration.. EC_{25} and EC_{50} values, along with the parameter in which these concentrations were observed.

Plant Species	No-effect Concentration	Parameter[x] Measured	EC_{25}	Parameter Measured	EC_{50}	Parameter Measured
Soybean	0.1	dw	0.175	dw	0.453	dw
Lettuce	<0.013	dw	0.010	dw	0.022	dw
Carrot	0.8	pr	ND[y]		ND	
Tomato	0.1	pr,ph	0.058	ph	0.178	ph
Cucumber	0.019	ph	0.006	dw	0.028	dw
Cabbage	0.05	dw	0.100	dw	0.223	dw
Oat	0.8	dw	1.41	dw	2.66	dw
Ryegrass	≥1.6[z]	pr,ph,dw	ND		ND	
Corn	0.8	pr,ph,dw	0.510	dw	1.15	ph,dw
Onion	0.1	dw	0.161	dw	0.326	dw

[x] ph - plant height, pr - phytotoxicity ratings, dw - dry weight determinations.

[y] A dosage response curve was not evident or the highest treatment concentration tested (1.6 lb ai/a) did not result in a significant effect, therefore a probit analysis could not be conducted to determine EC_{25} and EC_{50} values.

[z] Since 1.6 lb ai/a was the highest rate tested in this study, the actual no-effect concentration may be equal to or greater than 1.6 lb ai/a.

Table 19. Statistical no-effect concentration[y] and the mean phytotoxicity rating[z] at that concentration (lb ai/a) of prometryn (FL-870991) on plants 21 days after treatment.

Test Plant	No-effect Concentration	Mean Phytotoxicity Rating
Soybean	0.2	0.1
Lettuce	0.2	0.7
Carrot	0.8	0.0
Tomato	0.1	0.0
Cucumber	0.03	0.3
Cabbage	0.2	0.2
Oat	$\geq$1.6	0.3
Ryegrass	$\geq$1.6	0.5
Corn	0.8	0.6
Onion	0.4	0.9

[y] Highest treatment concentration which was statistically similar to the control, according to Duncan's New Multiple Range Test ($p \leq 0.05$).

[z] Phytotoxicity ratings based on a 0-4 scale, with 0 = no effect, 1 = slight effect limited to one leaf, 2 = moderate effect on whole plant, 3 = severe effect on whole plant, and 4 = total effect or plant death.

Table 20. Statistical no-effect concentration[x] (lb ai/a) of prometryn (FL-870991) on plant height, along with EC_{25} and EC_{50} values.

Test Plant	No-effect Concentration	EC_{25}	EC_{50}
Soybean	0.2	0.373	0.534
Lettuce	0.2	0.018	0.048
Carrot	≥1.6	ND[y]	ND
Tomato	0.1	0.058	0.178
Cucumber	0.019	0.038	0.066
Cabbage	0.2	<0.4	<0.8[z]
Oat	≥1.6	ND	ND
Ryegrass	≥1.6	ND	ND
Corn	0.8	0.609	1.15
Onion	0.4	0.233	0.348

[x] Highest treatment concentration which was statistically similar to the control 21 days after treatment, according to Duncan's New Multiple Range Test ($p \leq 0.05$).

[y] A dose response was not evident with the treatment range used or the highest treatment concentration was not significantly different ($p \leq 0.05$) from the control, therefore, probit analysis could not be conducted nor EC values determined.

[z] Treatments resulted in a steep dose response curve which did not provide sufficient data points to conduct a probit analysis.

Table 21. Statistical no-effect concentration[y] (lb ai/a) of prometryn (FL-870991) on plant dry weight, along with EC_{25} and EC_{50} values.

Test Plant	No-effect Concentration	EC_{25}	EC_{50}
Soybean	0.1	0.175	0.453
Lettuce	<0.013	0.010	0.022
Carrot	≥1.6	ND[z]	ND
Tomato	0.2	0.073	0.214
Cucumber	0.03	0.006	0.028
Cabbage	0.05	0.100	0.223
Oat	0.8	1.41	2.66
Ryegrass	≥1.6	ND	ND
Corn	0.8	0.510	1.15
Onion	0.1	0.161	0.326

why are these < NOEC? This makes no sense!

[y] Highest treatment concentration which was statistically similar to the control 21 days after treatment, according to Duncan's New Multiple Range Test ($p \leq 0.05$).

[z] A dose response was not evident with the treatment range used or the highest treatment concentration was not significantly different ($p \leq 0.05$) from the control, therefore, probit analysis could not be conducted nor EC values determined.

Table 1. Mean phytotoxicity rating[y] of soybean and lettuce plants 7, 14, and 21 days after treatment with prometryn (FL-870991).

Plant Species	Treatment (lb ai/a)	Days After Treatment 7	14	21
Soybean	0.0	0.0 C[z]	0.2 D	0.1 C
	0.1	0.5 C	0.7 CD	0.1 C
	0.2	1.9 B	1.2 BC	0.1 C
	0.4	2.5 AB	1.3 B	0.5 B
	0.8	2.9 A	2.8 A	3.5 A
	1.6	3.1 A	3.1 A	3.9 A
Lettuce	0.0	0.0 D	0.0 C	0.0 B
	0.1	0.7 C	1.1 B	0.0 B
	0.2	1.5 B	1.7 B	0.7 B
	0.4	2.7 A	3.9 A	4.0 A
	0.8	3.0 A	4.0 A	4.0 A
	1.6	3.1 A	4.0 A	4.0 A
Lettuce	0.0	0.0 C	0.0 C	0.0 C
	0.0125	0.1 C	0.0 C	0.0 C
	0.025	0.2 C	0.3 C	0.3 BC
	0.05	1.7 B	1.7 B	1.1 B
	0.1	3.9 A	3.8 A	3.7 A
	0.2	3.7 A	3.7 A	3.5 A

[y] Phytotoxicity ratings were based on a 0-4 scale, with 0 = no effect, 1 = slight effect limited to one leaf, 2 = moderate effect on whole plant, 3 = severe effect on whole plant, and 4 = total effect or plant death.

[z] The number of observations and the standard deviation of each treatment mean can be found in the raw data calculation sheets. Means for each plant species and observation date not followed by the same letter differ significantly according to Duncan's New Multiple Range Test ($p \leq 0.05$) (Attachment 1).

Table 7. Plant height and the percent difference[x] in height of soybean and lettuce plants prior to treatment and 21 days after treatment with prometryn (FL-870991). The percent effect on growth[y] was calculated for each treatment.

		Days After Treatment					
		0		21			
Species	(lb ai/a)	Plant Height (mm)	% Difference	Plant Height (mm)	% Difference	% Increase in Mean Height	% Effect on Growth
Soybean	0.0	69 A[z]		221 A		220	
	0.1	65 A	- 6	201 AB	- 9	209	- 5
	0.2	67 A	- 3	214 AB	- 3	219	0
	0.4	64 A	- 7	189 B	- 15	195	- 11
	0.8	65 A	- 6	84 C	- 62	29	- 87
	1.6	66 A	- 5	56 D	- 75	- 15	-107
Lettuce	0.0	43A		71 A		65	
	0.1	50 A	16	71 A	0	42	- 36
	0.2	48 A	13	64 A	- 9	33	- 49
	0.4	43 A	1	0 B	-100	-100	-254
	0.8	43 A	2	0 B	-100	-100	-254
	1.6	44 A	2	0 B	-100	-100	-254
Lettuce	0.0	40 A		140 A		250	
	0.0125	42 A	5	131 A	- 6	212	- 15
	0.025	43 A	7	113 A	- 19	163	- 35
	0.050	43 A	6	82 B	- 42	91	- 64
	0.1	40 A	0	7 C	- 95	- 83	-133
	0.2	40 A	- 1	17 C	- 88	- 58	-123

[x] Plant height observations were input into a Lotus 1-2-3 spreadsheet. Mean plant height, percent difference from the control, variance, and standard deviation were calculated using the spreadsheet.

[y] The percent increase in plant height from the zero (0) day reading to the 21 day reading was calculated along with the percent effect of the treatment on growth.

[z] Means for each crop and observation period not followed by the same letter differ significantly according to Duncan's New Multiple Range Test ($p \leq 0.05$).

ANOVA :- for lettuce - phytotoxicity data @ day -21

Analysis of Variance File: proletph Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment Prometryn (1lb ai/A)

Factors: T	R	N	Mean	S.D.
*	*	90	1.4333	1.9200
1	* – Control	15	0.0000	0.0000
2	* – 0.0125	15	0.0000	0.0000
3	* – 0.025	15	0.2667	1.0328
* 4	* – 0.05	15	1.1333	1.8074
* 5	* – 0.1	15	3.7333	1.0328
* 6	* – 0.2	15	3.4667	1.4075
*	1	30	1.3333	1.9179
*	2	30	1.6000	1.9931
*	3	30	1.3667	1.9025
1	1	5	0.0000	0.0000
1	2	5	0.0000	0.0000
1	3	5	0.0000	0.0000
2	1	5	0.0000	0.0000
2	2	5	0.0000	0.0000
2	3	5	0.0000	0.0000
3	1	5	0.0000	0.0000
3	2	5	0.8000	1.7889
3	3	5	0.0000	0.0000
4	1	5	0.0000	0.0000
4	2	5	1.6000	2.1909
4	3	5	1.8000	2.0494
5	1	5	4.0000	0.0000
5	2	5	4.0000	0.0000
5	3	5	3.2000	1.7889
6	1	5	4.0000	0.0000
6	2	5	3.2000	1.7889
6	3	5	3.2000	1.7889

Fmax for testing homogeneity of between subjects variances: Not defined

Analysis of Variance Dependent variable: PH

Source	df	SS (H)	MSS	F	P
Between Subjects	89	328.0999			
T (TRT)	5	224.7666	44.9533	37.117	0.0000
R (REP)	2	1.2667	0.6333	0.523	0.5979
TR	10	14.8667	1.4867	1.228	0.2865
Subj w Groups	72	87.2000	1.2111		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: proletph Date: 06-12-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.000	6	3.467
2	0.000		
3	0.267		
4	1.133		
5	3.733		

Comparison	Tukey-A*	~~Bon-~~ ~~ferroni~~	Dunnett
1 = 2			
1 < 3			
1 < 4	0.1000	0.0929	0.0500
1 < 5	0.0100	0.0000	0.0100
1 < 6	0.0100	0.0000	0.0100
2 < 3			N.A.
2 < 4	0.1000	0.0929	N.A.
2 < 5	0.0100	0.0000	N.A.
2 < 6	0.0100	0.0000	N.A.
3 < 4			N.A.
3 < 5	0.0100	0.0000	N.A.
3 < 6	0.0100	0.0000	N.A.
4 < 5	0.0100	0.0000	N.A.
4 < 6	0.0100	0.0000	N.A.
5 > 6			N.A.

not different from control

* different from control.

* The only possible P-values are .01, .05 or .10 (up to 0.1000). A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	1.333
2	1.600
3	1.367

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 < 3			
2 > 3			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000). A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible and only for comparisons with the control mean (level 1).

ANOVA: for cucumber - ~~phytotoxicity~~ phytotoxicity data @ day -21

Analysis of Variance File: procucph Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T	R	Treatment Prometryn (lb ai/A)	N	Mean	S.D.
*	*		90	1.7444	1.3947
1	*	Control	15	0.0000	0.0000
# 2	*	-0.019	15	0.8000	0.4140
# 3	*	-0.038	15	1.4000	0.6325
# 4	*	-0.075	15	1.8667	0.7432
# 5	*	-0.150	15	2.4000	0.9856
# 6	*	-0.300	15	4.0000	0.0000
*	1		30	1.6333	1.2994
*	2		30	1.7333	1.3629
*	3		30	1.8667	1.5477
1	1		5	0.0000	0.0000
1	2		5	0.0000	0.0000
1	3		5	0.0000	0.0000
2	1		5	1.0000	0.0000
2	2		5	1.0000	0.0000
2	3		5	0.4000	0.5477
3	1		5	1.4000	0.5477
3	2		5	1.0000	0.0000
3	3		5	1.8000	0.8367
4	1		5	1.6000	0.5477
4	2		5	2.0000	0.7071
4	3		5	2.0000	1.0000
5	1		5	1.8000	0.8367
5	2		5	2.4000	0.8944
5	3		5	3.0000	1.0000
6	1		5	4.0000	0.0000
6	2		5	4.0000	0.0000
6	3		5	4.0000	0.0000

Fmax for testing homogeneity of between subjects variances: Not defined

Analysis of Variance Dependent variable: PH

Source	df	SS (H)	MSS	F	P
Between Subjects	89	173.1222			
T (TRT)	5	143.7889	28.7578	92.436	0.0000
R (REP)	2	0.8222	0.4111	1.321	0.2712
TR	10	6.1111	0.6111	1.964	0.0497
Subj w Groups	72	22.4000	0.3111		

# Indicates significant effect ($p < 0.05$)

Analysis of Variance File: procucph Date: 06-12-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.000	6	4.000
2	0.800		
3	1.400		
4	1.867		
5	2.400		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2	0.0100	0.0031	0.0100
1 < 3	0.0100	0.0000	0.0100
1 < 4	0.0100	0.0000	0.0100
1 < 5	0.0100	0.0000	0.0100
1 < 6	0.0100	0.0000	0.0100
2 < 3	0.0500	0.0651	N.A.
2 < 4	0.0100	0.0000	N.A.
2 < 5	0.0100	0.0000	N.A.
2 < 6	0.0100	0.0000	N.A.
3 < 4			N.A.
3 < 5	0.0100	0.0000	N.A.
3 < 6	0.0100	0.0000	N.A.
4 < 5			N.A.
4 < 6	0.0100	0.0000	N.A.
5 < 6	0.0100	0.0000	N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible
and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	1.633
2	1.733
3	1.867

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 < 3			
2 < 3			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible
and only for comparisons with the control mean (level 1).

ANOVA: for tomato - phytotoxicity data @ day -21

Analysis of Variance File: protomph Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment Prometryn (lb ai/A)

Factors: T	R		N	Mean	S.D.
*	*		90	0.2222	0.4921
1	*	-Control	15	0.0000	0.0000
2	*	-0.0125	15	0.0000	0.0000
3	*	-0.025	15	0.0000	0.0000
4	*	-0.05	15	0.1333	0.3519
* 5	*	-0.1	15	0.4000	0.5071
* 6	*	-0.2	15	0.8000	0.7746
*	1		30	0.3667	0.6687
*	2		30	0.0667	0.2537
*	3		30	0.2333	0.4302
1	1		5	0.0000	0.0000
1	2		5	0.0000	0.0000
1	3		5	0.0000	0.0000
2	1		5	0.0000	0.0000
2	2		5	0.0000	0.0000
2	3		5	0.0000	0.0000
3	1		5	0.0000	0.0000
3	2		5	0.0000	0.0000
3	3		5	0.0000	0.0000
4	1		5	0.4000	0.5477
4	2		5	0.0000	0.0000
4	3		5	0.0000	0.0000
5	1		5	0.6000	0.5477
5	2		5	0.2000	0.4472
5	3		5	0.4000	0.5477
6	1		5	1.2000	1.0954
6	2		5	0.2000	0.4472
6	3		5	1.0000	0.0000

Fmax for testing homogeneity of between subjects variances: Not defined

Analysis of Variance Dependent variable: PH

Source	df	SS (H)	MSS	F	P
Between Subjects	89	21.5556			
T (TRT)	5	7.8222	1.5644	11.264	0.0000
R (REP)	2	1.3556	0.6778	4.880	0.0102
TR	10	2.3778	0.2378	1.712	0.0938
Subj w Groups	72	10.0000	0.1389		

* Indicate significant effect ($p < 0.05$)

Analysis of Variance File: protomph Date: 06-12-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.000	6	0.800
2	0.000		
3	0.000		
4	0.133		
5	0.400		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 = 2			
1 = 3			
1 < 4			
1 < 5	0.1000	0.0667	0.0500
1 < 6	0.0100	0.0000	0.0100
2 = 3			N.A.
2 < 4			N.A.
2 < 5	0.1000	0.0663	N.A.
2 < 6	0.0100	0.0000	N.A.
3 < 4			N.A.
3 < 5	0.1000	0.0663	N.A.
3 < 6	0.0100	0.0000	N.A.
4 < 5			N.A.
4 < 6	0.0100	0.0000	N.A.
5 < 6	0.1000	0.0663	N.A.

× not different from control

~ *

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible
and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	0.367
2	0.067
3	0.233

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2	0.0100	0.0079	0.0100
1 > 3			
2 < 3			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible
and only for comparisons with the control mean (level 1).

ANOVA for cucumber - plant height data @ day -21

Analysis of Variance File: procucht Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment Prometryn (lb ai/A)

	Factors: T	R	N	Mean	S.D.
	*	*	90	122.6333	40.9805
	1	* - Control	15	161.8000	12.5596
	2	* - 0.019	15	154.5333	14.9469
*	3	* - 0.038	15	137.8000	21.1532
*	4	* - 0.075	15	120.4667	21.5502
*	5	* - 0.150	15	108.8667	26.8989
*	6	* - 0.300	15	52.3333	13.2701
	*	1	30	126.9667	40.6444
	*	2	30	120.5333	42.9922
	*	3	30	120.4000	40.3063
	1	1	5	161.2000	9.6021
	1	2	5	167.8000	13.6088
	1	3	5	156.4000	13.8852
	2	1	5	156.6000	18.9156
	2	2	5	145.0000	5.0990
	2	3	5	162.0000	14.4741
	3	1	5	144.0000	27.0093
	3	2	5	144.4000	10.6911
	3	3	5	125.0000	20.3715
	4	1	5	128.6000	20.7437
	4	2	5	113.8000	22.6870
	4	3	5	119.0000	23.2271
	5	1	5	117.8000	22.5987
	5	2	5	105.2000	30.9063
	5	3	5	103.6000	30.2539
	6	1	5	53.6000	9.7108
	6	2	5	47.0000	15.5724
	6	3	5	56.4000	14.8762

Fmax for testing homogeneity of between subjects variances: 36.74
Number of variances= 18 df per variance= 4.

Analysis of Variance Dependent variable: HT

Source	df	SS (H)	MSS	F	P
Between Subjects	89	149466.9060			
T (TRT)	5	118769.5780	23753.9160	63.380	0.0000
R (REP)	2	845.2667	422.6333	1.128	0.3270
TR	10	2867.6665	286.7667	0.765	0.6638
Subj w Groups	72	26984.3828	374.7831		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: procucht Date: 06-12-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	161.800	6	52.333
2	154.533		
3	137.800		
4	120.467		
5	108.867		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3	0.0500	0.0170	0.0100
1 > 4	0.0100	0.0000	0.0100
1 > 5	0.0100	0.0000	0.0100
1 > 6	0.0100	0.0000	0.0100
2 > 3			N.A.
2 > 4	0.0100	0.0000	N.A.
2 > 5	0.0100	0.0000	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4			N.A.
3 > 5	0.0100	0.0018	N.A.
3 > 6	0.0100	0.0000	N.A.
4 > 5			N.A.
4 > 6	0.0100	0.0000	N.A.
5 > 6	0.0100	0.0000	N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000). A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	126.967
2	120.533
3	120.400

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
2 > 3			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000). A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible and only for comparisons with the control mean (level 1).

ANOVA: for tomato - plant height data @ day-21

Analysis of Variance File: protomht Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment Prometryn (lb ai/A)

Factors: T	R	N	Mean	S.D.
*	*	90	82.4444	61.1245
1	* - Control	15	145.2000	20.3196
2	* - 0.1	15	148.2000	9.4506
* 3	* - 0.2	15	125.9333	16.9851
* 4	* - 0.4	15	30.9333	37.4461
* 5	* - 0.8	15	21.0000	5.5934
* 6	* - 1.6	15	23.4000	5.0540
*	1	30	87.6333	63.4961
*	2	30	77.3333	58.9584
*	3	30	82.3667	62.4784
1	1	5	145.2000	18.5930
1	2	5	135.2000	28.4377
1	3	5	155.2000	6.3797
2	1	5	149.0000	10.5119
2	2	5	146.4000	12.0955
2	3	5	149.2000	7.0498
3	1	5	136.6000	20.8519
3	2	5	117.8000	12.7554
3	3	5	123.4000	13.3903
4	1	5	50.0000	63.7770
4	2	5	21.0000	12.2066
4	3	5	21.8000	3.0332
5	1	5	21.6000	6.5038
5	2	5	21.6000	5.9414
5	3	5	19.8000	5.4037
6	1	5	23.4000	2.0736
6	2	5	22.0000	5.2440
6	3	5	24.8000	7.2595

Fmax for testing homogeneity of between subjects variances: 945.93
Number of variances= 18 df per variance= 4.

Analysis of Variance Dependent variable: HT

Source	df	SS (H)	MSS	F	P
Between Subjects	89	332522.2500			
T (TRT)	5	301025.9400	60205.1880	161.856	0.0000
R (REP)	2	1591.6222	795.8111	2.139	0.1242
TR	10	3123.0447	312.3045	0.840	0.5954
Subj w Groups	72	26781.6562	371.9674		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: protomht Date: 06-12-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	145.200	6	23.400
2	148.200		
3	125.933		
4	30.933		
5	21.000		

Comparison	Tukey-A*	Bon-ferroni	Dunnett	
1 < 2				
1 > 3	0.1000		0.0500	
1 > 4	0.0100	0.0000	0.0100	*
1 > 5	0.0100	0.0000	0.0100	*
1 > 6	0.0100	0.0000	0.0100	*
2 > 3	0.0500	0.0346	N.A.	
2 > 4	0.0100	0.0000	N.A.	
2 > 5	0.0100	0.0000	N.A.	
2 > 6	0.0100	0.0000	N.A.	
3 > 4	0.0100	0.0000	N.A.	
3 > 5	0.0100	0.0000	N.A.	
3 > 6	0.0100	0.0000	N.A.	
4 > 5			N.A.	
4 > 6			N.A.	
5 < 6			N.A.	

not different from control

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible
and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	87.633
2	77.333
3	82.367

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
2 < 3			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible
and only for comparisons with the control mean (level 1).

ANOVA: for cabbage - plant height data @ day -21

Analysis of Variance File: procabht Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment Prometryn (lb ai/A)

Factors: T	R	N	Mean	S.D.
*	*	90	57.5667	36.4507
1	* - Control	15	85.8000	9.1433
2	* - 0.1	15	84.0667	10.3404
3	* - 0.2	15	82.0667	9.1141
* 4	* - 0.4	15	63.1333	44.5996
* 5	* - 0.8	15	17.1333	4.2235
* 6	* - 1.6	15	13.2000	4.7389
*	1	30	58.5667	34.6238
*	2	30	57.9667	36.4725
*	3	30	56.1667	39.3105
1	1	5	85.0000	7.1764
1	2	5	84.2000	12.1120
1	3	5	88.2000	9.1214
2	1	5	80.4000	7.7974
2	2	5	86.6000	11.0589
2	3	5	85.2000	12.8335
3	1	5	80.8000	8.8713
3	2	5	85.4000	7.7653
3	3	5	80.0000	11.4237
4	1	5	74.2000	37.0904
4	2	5	63.0000	40.8901
4	3	5	52.2000	60.0974
5	1	5	21.0000	2.6458
5	2	5	14.8000	3.1145
5	3	5	15.6000	4.1593
6	1	5	10.0000	3.5355
6	2	5	13.8000	2.8636
6	3	5	15.8000	6.0166

Fmax for testing homogeneity of between subjects variances: 515.96
Number of variances= 18 df per variance= 4.

Analysis of Variance Dependent variable: HT

Source	df	SS (H)	MSS	F	P
Between Subjects	89	118250.1020			
T (TRT)	5	86007.9530	17201.5898	40.480	0.0000
R (REP)	2	93.6000	46.8000	0.110	0.8966
TR	10	1552.5332	155.2533	0.365	0.9579
Subj w Groups	72	30596.0312	424.9449		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: procabht Date: 06-12-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	85.800	6	13.200
2	84.067		
3	82.067		
4	63.133		
5	17.133		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4	0.0500	0.0539	0.0500
1 > 5	0.0100	0.0000	0.0100
1 > 6	0.0100	0.0000	0.0100
2 > 3			N.A.
2 > 4	0.1000		N.A.
2 > 5	0.0100	0.0000	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4			N.A.
3 > 5	0.0100	0.0000	N.A.
3 > 6	0.0100	0.0000	N.A.
4 > 5	0.0100	0.0000	N.A.
4 > 6	0.0100	0.0000	N.A.
5 > 6			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000). A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	58.567
2	57.967
3	56.167

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
2 > 3			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000). A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible and only for comparisons with the control mean (level 1).

ANOVA: for lettuce - plant dry weight @ day -21

Analysis of Variance File: proletdw Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T (Treatment (Prometryn 16 ai/A))	N	Mean	S.D.
*	18	55.9444	46.8219
1 - Control	3	133.3333	11.0151
* 2 - 0.013	3	84.6667	8.0829
* 3 - 0.025	3	63.3333	9.2916
* 4 - 0.050	3	43.0000	13.5277
* 5 - 0.100	3	4.3333	3.2146
* 6 - 0.200	3	7.0000	5.0000

Fmax for testing homogeneity of between subjects variances: 17.71
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	37268.9450			
T (TRT)	5	36286.2810	7257.2563	88.623	0.0000
Subj w Groups	12	982.6641	81.8887		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	133.333	6	7.000
2	84.667		
3	63.333		
4	43.000		
5	4.333		

* Indicates significant effect ($p < 0.05$)

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2	0.0100	0.0005	0.0100
1 > 3	0.0100	0.0000	0.0100
1 > 4	0.0100	0.0000	0.0100
1 > 5	0.0100	0.0000	0.0100
1 > 6	0.0100	0.0000	0.0100
2 > 3			N.A.
2 > 4	0.0100	0.0018	N.A.
2 > 5	0.0100	0.0000	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4			N.A.
3 > 5	0.0100	0.0000	N.A.
3 > 6	0.0100	0.0000	N.A.
4 > 5	0.0100	0.0034	N.A.
4 > 6	0.0100	0.0061	N.A.
5 < 6			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible.

ANOVA :- for cucumber -plant dry weight- @ day-21

Analysis of Variance File: procucdw Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T (Treatment – Prometryn (16 ai/A))	N	Mean	S.D.
*	18	277.4445	185.5577
1 - Control	3	616.3333	89.9852
* 2 - 0.019	3	335.0000	60.6218
* 3 - 0.038	3	291.3333	62.0027
* 4 - 0.075	3	195.3333	27.9702
* 5 - 0.150	3	158.0000	42.8836
* 6 - 0.300	3	68.6667	2.8868

Fmax for testing homogeneity of between subjects variances: 971.68
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	585338.3800			
T (TRT)	5	548845.7500	109769.1480	36.096	0.0000
Subj w Groups	12	36492.6250	3041.0520		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	616.333	6	68.667
2	335.000		
3	291.333		
4	195.333		
5	158.000		

* Indicates significant effect ($p < 0.05$)

Comparison	Tukey-A*	Bonferroni	Dunnett
1 > 2	0.0100	0.0008	0.0100
1 > 3	0.0100	0.0000	0.0100
1 > 4	0.0100	0.0000	0.0100
1 > 5	0.0100	0.0000	0.0100
1 > 6	0.0100	0.0000	0.0100
2 > 3			N.A.
2 > 4	0.1000		N.A.
2 > 5	0.0500	0.0305	N.A.
2 > 6	0.0100	0.0012	N.A.
3 > 4			N.A.
3 > 5	0.1000		N.A.
3 > 6	0.0100	0.0054	N.A.
4 > 5			N.A.
4 > 6			N.A.
5 > 6			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

For Dunnett's test only the P-values .05 and .01 are possible

ANOVA : for cabbage - plant dry weight @ day -21

Analysis of Variance File: procabdw Date: 06-12-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T Treatment Prometryn (lb ai/A)

		N	Mean	S.D.
	*	18	322.2222	95.6437
	1 - Control	3	349.6667	59.4755
	2 - 0.013	3	406.6667	56.8976
	3 - 0.025	3	319.0000	26.8887
	4 - 0.050	3	414.0000	76.4918
	5 - 0.100	3	240.3333	85.6524
*	6 - 0.200	3	203.6667	38.1095

Fmax for testing homogeneity of between subjects variances: 10.15
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	155511.1090			
T (TRT)	5	111236.4450	22247.2891	6.030	0.0051
Subj w Groups	12	44274.6640	3689.5554		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	349.667	6	203.667
2	406.667		
3	319.000		
4	414.000		
5	240.333		

* Indicates significant effect ($p < 0.05$)

Comparison	Tukey-A*	Bonferroni	Dunnett
1 < 2			
1 > 3			
1 < 4			
1 > 5			
1 > 6	0.1000 X		0.0500
2 > 3			N.A.
2 < 4			N.A.
2 > 5	0.1000	0.0867	N.A.
2 > 6	0.0500	0.0229	N.A.
3 < 4			N.A.
3 > 5			N.A.
3 > 6			N.A.
4 > 5	0.0500	0.0661	N.A.
4 > 6	0.0500	0.0177	N.A.
5 > 6			N.A.

* The only possible P-values are .01, .05 or .10 (up to 0.1000).
A blank means the P-value is greater than 0.1000.

Regression Analyses for EC_{50} & EC_{25} values :-

D11:

REA

	A	B	C	D	E	F	G	H
1								
2	prometryn/cabbage/plant height/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.1	-2	-1.00	2.95				
7	0.2	-4	-0.70	3.25				
8	0.4	-26	-0.40	4.36				
9	0.8	-80	-0.10	5.84				
10	1.6	-85	0.20	6.04				
11								
12	Regression Output:							
13	Constant			5.647330				
14	Std Err of Y Est			0.391488				
15	R Squared			0.943591				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	2.913330						
20	Std Err of Coef.	0.411253						

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Regression Equation : $Y = a + bX$

$Y = 5.65 + 2.91X$

Calculated EC_{50} = 0.59 lb ai/A

Calculated EC_{25} = 0.35 lb ai/A.

Regression Analyses for EC_{25} & EC_{50} values :-

D11: READY

	A	B	C	D	E	F	G	H
1								
2	prometryn/tomato/plant height/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.1	2	-1.00					
7	0.2	-13	-0.70	3.87				
8	0.4	-79	-0.40	5.81				
9	0.8	-85	-0.10	6.04				
10	1.6	-84	0.20	5.99				
11								
12		Regression Output:						
13	Constant			5.969150				
14	Std Err of Y Est			0.739009				
15	R Squared			0.665325				
16	No. of Observations			4				
17	Degrees of Freedom			2				
18								
19	X Coefficient(s)	2.189150						
20	Std Err of Coef.	1.097880						

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Regression Equation = $Y = a + bX$

$Y = 5.97 + 2.19X$

Calculated EC_{50} = 0.36 lb ai/A.

Calculated EC_{25} = 0.18 lb ai/A.

Regression Analysis for EC_{50} & EC_{25} values:-

D11: READY

	A	B	C	D	E	F	G	H
1								
2	prometryn/cucumber/plant height/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.019	-4	-1.72	3.25				
7	0.038	-15	-1.42	3.96				
8	0.075	-26	-1.12	4.36				
9	0.15	-33	-0.82	4.56				
10	0.3	-68	-0.52	5.47				
11								
12	Regression Output:							
13	Constant			6.210985				
14	Std Err of Y Est			0.195345				
15	R Squared			0.956901				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	1.684412						
20	Std Err of Coef.	0.206389						

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Regression Equation: $Y = a + bX$

$Y = 6.21 + 1.68X$

Calculated EC_{50} = 0.19 lb ai/A

Calculated EC_{25} = 0.08 lb ai/A

Regression Analyse for EC_{25} & EC_{50} values :-

D11: READY

	A	B	C	D	E	F	G	H
1								
2	prometryn/cucumber/dry weight/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.019	-46	-1.72	4.9				
7	0.038	-53	-1.42	5.08				
8	0.075	-68	-1.13	5.47				
9	0.15	-74	-0.82	5.64				
10	0.3	-89	-0.52	6.23				
11								
12	Regression Output:							
13	Constant			6.673756				
14	Std Err of Y Est			0.124101				
15	R Squared			0.957349				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	1.076911						
20	Std Err of Coef.	0.131233						

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Regression Equation = $Y = a + bX$

$Y = 6.67 + 1.08X$

Calculated EC_{50} = 0.03 lb ai/A

Calculated EC_{25} = 0.007 lb ai/A.

Regression Analyse for EC_{25} & EC_{50} Value :-

D11: READY

	A	B	C	D	E	F	G	H
1								
2	prometryn/lettuce/dry weight/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.013	-37	-1.89	4.67				
7	0.025	-52	-1.60	5.05				
8	0.05	-68	-1.30	5.47				
9	0.1	-97	-1.00	6.88				
10	0.2	-95	-0.70	6.64				
11								
12	Regression Output:							
13	Constant			8.259408				
14	Std Err of Y Est			0.395478				
15	R Squared			0.876636				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	1.940014						
20	Std Err of Coef.	0.420172						

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Regression Equation : $Y = a + bX$

$Y = 8.26 + 1.94X$

Calculated EC_{50} = 0.021 lb ai/A

Calculated EC_{25} = 0.009 lb ai/A

Regression Analysis for EC_{25} & EC_{50} values :-

D7: 3.66 READY

	A	B	C	D	E	F	G	H
1								
2	prometryn/cabbage/dry weight/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.013	16	-1.88	-4.01				
7	0.025	-9	-1.60	3.66				
8	0.05	18	-1.30	-4.08				
9	0.1	-31	-1.00	4.5				
10	0.2	-42	-0.70	4.8				
11								
12		Regression Output:						
13	Constant			9.010077				
14	Std Err of Y Est			4.119775				
15	R Squared			0.398624				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	6.201663						
20	Std Err of Coef.	4.397825						

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Regression Equation : $Y = a + bX$

$Y = 9.01 + 6.20X$

Calculated EC_{50} = 0.226 lb ai/A

Calculated EC_{25} = 0.175 lb ai/A

Table A modified with reviewer's calculations.

The following table lists the lowest observed no-effect concentration.. EC_{25} and EC_{50} values, along with the parameter in which these concentrations were observed.

Plant Species	No-effect Concentration	Parameter[x] Measured	EC_{25}	Parameter Measured	EC_{50}	Parameter Measured
Soybean	0.1	dw	0.175	dw	0.453	dw
Lettuce	<0.013	dw	0.010	dw	0.022	dw
Carrot	0.8	pr	ND[y]		ND	
Tomato	0.1 0.05	pr,ph	0.058	ph	0.178	ph
Cucumber	0.019	ph	0.006	dw	0.028	dw
Cabbage	0.05	dw	0.100	dw	0.223	dw
Oat	0.8	dw	1.41	dw	2.66	dw
Ryegrass	≥1.6[z] 1.6	pr,ph,dw	ND		ND	
Corn	0.8	pr,ph,dw	0.510	dw	1.15	ph,dw
Onion	0.1	dw	0.161	dw	0.326	dw

[x] ph - plant height, pr - phytotoxicity ratings, dw - dry weight determinations.

[y] A dosage response curve was not evident or the highest treatment concentration tested (1.6 lb ai/a) did not result in a significant effect, therefore a probit analysis could not be conducted to determine EC_{25} and EC_{50} values.

[z] Since 1.6 lb ai/a was the highest rate tested in this study, the actual no-effect concentration may be equal to or greater than 1.6 lb ai/a.

Table 19 modified with reviewer's calculations

Table 19. Statistical no-effect concentration[y] and the mean phytotoxicity rating[z] at that concentration (lb ai/a) of prometryn (FL-870991) on plants 21 days after treatment.

Test Plant	No-effect Concentration		Mean Phytotoxicity Rating	
Soybean	0.2		0.1	
Lettuce	0.2	0.025	0.7	0.3
Carrot	0.8		0.0	
Tomato	0.1	0.05	0.0	0.1
Cucumber	0.03		0.3	
Cabbage	0.2		0.2	
Oat	≥1.6		0.3	
Ryegrass	≥1.6		0.5	
Corn	0.8		0.6	
Onion	0.4		0.9	

[y] Highest treatment concentration which was statistically similar to the control, according to Duncan's New Multiple Range Test ($p \leq 0.05$).

[z] Phytotoxicity ratings based on a 0-4 scale, with 0 = no effect, 1 = slight effect limited to one leaf, 2 = moderate effect on whole plant, 3 = severe effect on whole plant, and 4 = total effect or plant death.

Table 20 modified with reviewer's calculations

Table 20. Statistical no-effect concentration[x] (lb ai/a) of prometryn (FL-870991) on plant height, along with EC_{25} and EC_{50} values.

Test Plant	No-effect Concentration	EC_{25}	EC_{50}
Soybean	0.2	0.373	0.534
Lettuce	0.2 0.025	0.018	0.048
Carrot	≥1.6	ND[y]	ND
Tomato	0.1	0.058	0.178
Cucumber	0.019	0.038	0.066
Cabbage	0.2	<0.4	<0.8[z]
Oat	≥1.6	ND	ND
Ryegrass	≥1.6	ND	ND
Corn	0.8	0.609	1.15
Onion	0.4	0.233	0.348

[x] Highest treatment concentration which was statistically similar to the control 21 days after treatment, according to Duncan's New Multiple Range Test ($p \leq 0.05$).

[y] A dose response was not evident with the treatment range used or the highest treatment concentration was not significantly different ($p \leq 0.05$) from the control, therefore, probit analysis could not be conducted nor EC values determined.

[z] Treatments resulted in a steep dose response curve which did not provide sufficient data points to conduct a probit analysis.

Table 21 modified with reviewer's calculations

Table 21. Statistical no-effect concentration[y] (lb ai/a) of prometryn (FL-870991) on plant dry weight, along with EC_{25} and EC_{50} values.

Test Plant	No-effect Concentration	EC_{25}	EC_{50}
Soybean	0.1	0.175	0.453
Lettuce	<0.013	0.010	0.022
Carrot	≥1.6	ND[z]	ND
Tomato	0.2	0.073	0.214
Cucumber	0.03 0.02	0.006	0.028
Cabbage	0.05	0.100	0.223
Oat	0.8	1.41	2.66
Ryegrass	≥1.6	ND	ND
Corn	0.8	0.510	1.15
Onion	0.1	0.161	0.326

[y] Highest treatment concentration which was statistically similar to the control 21 days after treatment, according to Duncan's New Multiple Range Test ($p \leq 0.05$).

[z] A dose response was not evident with the treatment range used or the highest treatment concentration was not significantly different ($p \leq 0.05$) from the control, therefore, probit analysis could not be conducted nor EC values determined.