Ignite File Copy 128850

12/24/90

MRID No. 413961-12

DATA EVALUATION RECORD

1. **CHEMICAL:** Glufosinate.
Shaughnessy No. 128850.

2. **TEST MATERIAL:** Hoe 039866: Ammonium-DL-homoalanin-4yl(methyl)phosphinate; Trade name: Ignite Technical (CAS NO. 77182-82-2); 96.2% active ingredient; a solid, white powder.

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:** Chetram, R.S. 1989. Hoe 039866: Tier II Vegetative Vigor Nontarget Phytotoxicity Study: Maximum Application Rate of 0.4 lbs a.i./Acre. Laboratory Project ID No. LR89-15A. Conducted by Pan-Agricultural Laboratories, Inc., Madera, CA. Submitted by Hoechst Celanese Corporation, Somerville, NJ. MRID No. 413961-12.

5. **REVIEWED By:**

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

Signature: Judy Awong
Date: 6/19/90

6. **APPROVED BY:**

Pim Kosalwat, Ph.D.
Staff Toxicologist
KBN Engineering and
Applied Sciences, Inc.

Signature: P. Kosalwat
Date: 6/19/90

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

Signature: H.T. Craven
Date: 12/20/90

M. Reynolds 12/24/9

18 hrs

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7. CONCLUSIONS: The study was conducted in a scientifically sound manner. Some inconsistencies were observed between the reviewer's and the author's statistical analyses. These differences, however, did not adversely affect the results or conclusions of the study.

Based on the author's and the reviewer's statistical analyses, the NOEC values for lettuce, ryegrass and cucumber were <0.05 lb ai/A HOE 039866. The NOEC value for tomato was 0.1 lb ai/A while the values for soybean, carrot, and onion were 0.2 lb ai/A. The NOEC values for cabbage, oat, and corn were 0.4 lb/A, the highest concentration tested. The EC50 value for lettuce (0.24) is <0.75 lb ai/A. The EC25 values for soybean, lettuce, tomato, cucumber, cabbage, and ryegrass were also <0.75 lb ai/A. The EC25 and EC50 values for carrot, oat and onion were >0.75 lb ai/A. The study results indicate that a Tier III study is required.

8. RECOMMENDATIONS: Based on the study results, a Tier III study is recommended for at least those plant species exhibiting phytotoxicity effects (i.e., soybean, lettuce, carrot, tomato, cucumber, ryegrass, and onion).

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 199.3 mg HOE 039866 in 200 ml of distilled water/Triton X-100 (1000 ppm). 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 50 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: HOE 039866 was applied at the rates of 0, 0.025, 0.05, 0.1, 0.2, and 0.4 lb ai/A to all eight plant species. An additional treatment of HOE 039866 was applied to ryegrass at the rates of 0, 0.0025, 0.005, 0.010, 0.020, and 0.040 lb ai/A to determine a no-effect level on plant height and dry weight. Treatment application rates were calculated on the percent active ingredient of the technical material (i.e., 96.2% 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 a SAS 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 16 (attached) summarizes the NOEC values of HOE 039866 for mean phytotoxicity rating. Treatment of all plant species with HOE 039866 at a concentration of 0.2 lb ai/A did not result in a significant effect ($p < 0.05$) on the day-21 mean phytotoxicity rating on any of the ten crops tested. Treatment with the maximum concentration of 0.4 lb ai/A resulted in a significant effect ($p < 0.05$) on the 21-day mean phytotoxicity rating of lettuce, carrot and tomato. Crops listed (with NOEC, lb ai/A) in order of increasing sensitivity to HOE 039866 based on phytotoxicity rating NOEC values, are as follows:

soybean = cucumber = cabbage = oat = ryegrass = corn = onion (0.4) < lettuce = carrot = tomato (0.2)

Plant height. Table 17 (attached) summarizes the NOEC, EC25 and EC50 of HOE 039866 on plant height. Treatment of all ten plant species with HOE 039866 at the lowest concentration of 0.025 lb ai/A resulted in a significant effect ($p < 0.05$) on plant height of ryegrass at the 21-day

observation period. Treatment with the maximum concentration of 0.4 lb ai/A resulted in a significant effect ($p < 0.05$) on plant height of lettuce, cucumber, and ryegrass at test termination (21 days). Ryegrass required a study continuation to determine a plant height no-effect level. Cucumber exhibited 157% increase in mean height with a 41% beneficial effect on growth at the maximum concentration of 0.4 lb ai/A. Plant species listed (with NOEC, lb ai/A) in order of increasing sensitivity to HOE 039866, based on plant height NOEC values, are as follows:

soybean = carrot = tomato = cabbage = oat = corn = onion (0.4) < lettuce = cucumber (0.2) < ryegrass (0.04)

All plant species except cucumber and corn exhibited a plant height dose-response relationship. Due to a lack of dose response to HOE 039866, EC values were not determined for cucumber and corn. Cabbage was the least sensitive plant species while lettuce was the most sensitive. Crops listed (with EC50, lb ai/A) in order of increasing sensitivity to HOE 039866, based on plant height EC50 values, are as follows:

cabbage (3.9×10^{8}) < oat (701,000) < carrot (43,400) < soybean (844) < ryegrass (158) < onion (45.3) < tomato (40.3) < lettuce (0.267)

Plant dry weight. The NOEC, EC25, and EC50 of HOE 039866 for plant dry weight are summarized in Table 18 (attached). Treatment of all plant species with glufosinate at the lowest concentration of 0.025 lb ai/A resulted in a significant effect ($p < 0.05$) in plant dry weight of ryegrass. Treatment with the maximum concentration of 0.4 lb ai/A resulted in a significant effect ($p < 0.05$) on plant dry weight of soybean, lettuce, cucumber, and ryegrass. Ryegrass was the most sensitive and required a study continuation to determine a dry weight no-effect level. Plants species listed (with NOEC, lb ai/A) in order of increasing sensitivity to HOE 039866, based on dry weight NOEC values, are as follows:

carrot = tomato = cabbage = oat = corn = onion (0.4) < soybean (0.2) < lettuce = cucumber (0.05) < ryegrass (0.04)

Carrot, oat and corn did not exhibit a dose response to HOE 039866 at the concentrations tested; therefore, EC values were not determined. Probit analysis of the plant dry weight data showed that onion was the least sensitive plant species while lettuce was the most sensitive. Plants listed (with EC50, lb ai/A) in order of increasing sensitivity to

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HOE 039866, based on plant dry weight EC50 values, are as follows:

onion (257) < ryegrass (61.0) < cabbage (38.9) < cucumber (5.53) < tomato (2.46) < soybean (2.06) < lettuce (0.24)

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 or report.

B. Statistical Analysis: Statistical analyses were conducted by the reviewer for selected species and parameters using the analysis of variance with Tukey's, Bonferroni'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 lettuce and tomato based on phytotoxicity rating. The reviewer's NOEC value for both lettuce and tomato was 0.1 lb ai/A, whereas the author's NOEC value was 0.2 lb ai/A.

o Differences were observed between the reviewer's and the author's statistical NOEC values for tomato and onion based on plant height data. The reviewer's NOEC value for both tomato and onion was 0.2 lb ai/A, whereas the author's NOEC value was 0.4 lb ai/A.

EC25 and EC50 values for selected species were calculated by the reviewer using a Lotus 1-2-3 regression analysis. Some differences were observed between the reviewer's calculated EC values and those reported by the author. These differences, however, do not affect the overall conclusions of the report since the EC values were greater than the maximum application rate of 0.4 lb ai/A. The following discrepancies were observed:

o Regression analyses of plant height data indicate differences in EC25 and EC50 values for cabbage, tomato

and onion. The reviewer's calculated EC25 and EC50 values for cabbage (6.36 lb ai/A and 79.73 lb ai/A, respectively), were not in agreement with the author's values of 16,200 lb ai/A and 3.9×10^8 lb ai/A, respectively. Also, the reviewer's calculated EC50 values for tomato and onion (4.60 and 338.39 lb ai/A, respectively) differed from the author's values of 40.2 and 45.3 lb ai/A, respectively.

o The reviewer's regression analysis of plant dry weight data for cabbage indicated an EC50 value of 2.75 lb ai/A. The author's reported EC50 value was 38.9 lb ai/A.

C. Discussion/Results: This report is considered to be scientifically valid. This data validation process has been conducted based on the assumption that the maximum application rate is 0.4 lb ai/A. Treatment with the maximum concentration of 0.4 lb ai/A resulted in a significant effect ($p < 0.05$) on the 21-day mean phytotoxicity rating of lettuce, carrot, and tomato. Treatment with the maximum concentration of 0.4 lb ai/A resulted in a significant effect ($p < 0.05$) on plant height of lettuce, tomato, cucumber, ryegrass, and onion. Significant effects ($p < 0.05$) were observed on plant dry weight of soybean, lettuce, cucumber, and ryegrass at the maximum treatment concentration of 0.4 lb ai/A. Ryegrass and lettuce were the most sensitive plant species to HOE 039866.

Based on the author's and the reviewer's statistical analyses, the NOEC values for lettuce, ryegrass and cucumber were <0.05 lb ai/A HOE 039866. The NOEC value for tomato was 0.1 lb ai/A while the values for soybean, carrot, and onion were 0.2 lb ai/A. The NOEC values for cabbage, oat, and corn were 0.4 lb/A, the highest concentration tested. The EC50 value for lettuce (0.24) is <0.75 lb ai/A. The EC25 values for soybean, lettuce, tomato, cucumber, cabbage, and ryegrass were also <0.75 lb ai/A. The EC25 and EC50 values for carrot, oat and onion were >0.75 lb ai/A. Based on the results of the study, a Tier III study is recommended at least for those plant species exhibiting phytotoxicity effects.

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-a :- Modified with reviewer's values.

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

Plant Species	No-effect Concentration	Parameter[y] Measured	EC_{25}	Parameter Measured	EC_{50}	Parameter Measured
Soybean	0.2	dw	0.405	dw	2.06	dw
Lettuce	0.05	dw	0.137	dw	0.240	dw
Carrot	0.2	pr	127	ph	43,400	ph
Tomato	0.2 0.1	pr	0.74	dw	2.46	dw
Cucumber	0.05	dw	0.391	dw	5.53	dw
Cabbage	0.4	pr,ph,dw	0.444	dw	2.75	dw
Oat	0.4	pr,ph,dw	201	ph	701,000	ph
Ryegrass	0.04	ph,dw	0.607	dw	61.0	dw
Corn	0.4	pr,ph,dw	ND[z]		ND	
Onion	0.4 0.2	pr,ph,dw ph	2.48	ph	256	ph, dw

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

[z] A dosage response curve was not evident or the highest treatment concentration tested (0.4 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.

Table 16-A : Modified with reviewer's values.

Table 16. Statistical no effect concentration* (lb ai/A) and the mean phytotoxicity rating** at that concentration rate of HOE 039866 on plants 21 days after treatment.

Plant Species	No-effect Concentration	Mean Phytotoxicity Rating
Soybean	0.4	0.2
Lettuce	0.2 0.1	1.0 0.4
Carrot	0.2	0.3
Tomato	0.2 0.1	0.5 0.1
Cucumber	0.4	0.2
Cabbage	0.4	0.1
Oat	0.4	0.0
Ryegrass	0.4	0.1
Corn	0.4	0.0
Onion	0.4	0.7

* Highest treatment concentration which was statistically similar to the control, according to Duncan's New Multiple Range Test ($p < 0.05$).

** Phytotoxicity ratings based on 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 17-a : Modified with reviewer's values.

Table 17. Statistical no-effect concentration* (lb ai/A) rate of HOE 039866 on plant height, along with EC25 and EC50 values.

Plant Species	No-effect Concentration	EC25	EC50
Soybean	0.4	31.2	844
Lettuce	0.2	0.182	0.267
Carrot	0.4	127	43,400
Tomato	0.4 0.2	1.52 0.86	40.2 4.60
Cucumber	0.2	ND**	ND
Cabbage	0.4	16,200 6.36	3.9 x 10 (8) 79.73
Oat	0.4	201	701,000
Ryegrass	0.04	2.25	158
Corn	0.4	ND	ND
Onion	0.4 0.2	2.48 1.22	45.3 338.39

* Highest treatment concentration which was statistically similar to the control, 21 days after treatments, according to Duncan's New Multiple Range Test ($p < 0.05$).

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

Table 18-a : Modified with reviewer's values.

Table 18. Statistical no-effect concentration* (lb ai/A) rate of HOE 039866 on plant dry weight, along with EC25 and EC50 values.

Plant Species	No-effect Concentration	EC25	EC50
Soybean	0.2	0.405	2.06
Lettuce	0.05 0.1	0.137	0.240
Carrot	0.4	ND**	ND
Tomato	0.4	0.740	2.46
Cucumber	0.05	0.391	5.53
Cabbage	0.4	0.444	2.75
Oat	0.4	ND	ND
Ryegrass	0.04	0.607	61.0
Corn	0.4	ND	ND
Onion	0.4	25.6	256

* Highest treatment concentration which was statistically similar to the control, 21 days after treatments, according to Duncan's New Multiple Range Test ($p < 0.05$).

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

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ANOVA: for tomato - phytotoxicity data at day 21.

Analysis of Variance File: glutomph Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment HOE 039866 (lb ai/A)

	Factors: T	R	N	Mean	S.D.
	*	*	90	0.3111	0.5737
	1	* – Control	15	0.0667	0.2582
	2	* – 0.025	15	0.0000	0.0000
	3	* – 0.05	15	0.2000	0.4140
	4	* – 0.10	15	0.0667	0.2582
*	5	* – 0.20	15	0.4667	0.6399
*	6	* – 0.40	15	1.0667	0.7037
	*	1	30	0.3333	0.6609
	*	2	30	0.2333	0.4302
	*	3	30	0.3667	0.6149
	1	1	5	0.0000	0.0000
	1	2	5	0.0000	0.0000
	1	3	5	0.2000	0.4472
	2	1	5	0.0000	0.0000
	2	2	5	0.0000	0.0000
	2	3	5	0.0000	0.0000
	3	1	5	0.4000	0.5477
	3	2	5	0.2000	0.4472
	3	3	5	0.0000	0.0000
	4	1	5	0.0000	0.0000
	4	2	5	0.2000	0.4472
	4	3	5	0.0000	0.0000
	5	1	5	0.0000	0.0000
	5	2	5	0.4000	0.5477
	5	3	5	1.0000	0.7071
	6	1	5	1.6000	0.5477
	6	2	5	0.6000	0.5477
	6	3	5	1.0000	0.7071

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	29.2889			
T (TRT)	5	12.3556	2.4711	15.886	0.0000
R (REP)	2	0.2889	0.1444	0.929	0.4041
TR	10	5.4444	0.5444	3.500	0.0008
Subj w Groups	72	11.2000	0.1556		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: glutomph Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.067	6	1.067
2	0.000		
3	0.200		
4	0.067		
5	0.467		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 < 3			
1 = 4			
1 < 5	0.1000		**0.0500**
1 < 6	0.0100	0.0000	**0.0100**
2 < 3			N.A.
2 < 4			N.A.
2 < 5	0.0500	0.0273	N.A.
2 < 6	0.0100	0.0000	N.A.
3 > 4			N.A.
3 < 5			N.A.
3 < 6	0.0100	0.0000	N.A.
4 < 5	0.1000		N.A.
4 < 6	0.0100	0.0000	N.A.
5 < 6	0.0100	0.0014	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	0.333
2	0.233
3	0.367

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 carrot - phytotoxicity data at day 21

Analysis of Variance File: glucarph Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment- HOE 039866 (lb ai/A)

	Factors: T	R	N	Mean	S.D.
	*	*	90	0.1778	0.4127
	1	* - Control	15	0.0000	0.0000
	2	* - 0.025	15	0.0000	0.0000
	3	* - 0.05	15	0.0667	0.2582
	4	* - 0.10	15	0.2667	0.4577
	5	* - 0.20	15	0.2667	0.5936
*	6	* - 0.40	15	0.4667	0.5164
	*	1	30	0.1333	0.3457
	*	2	30	0.1333	0.3457
	*	3	30	0.2667	0.5208
	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	0.2000	0.4472
	3	3	5	0.0000	0.0000
	4	1	5	0.2000	0.4472
	4	2	5	0.2000	0.4472
	4	3	5	0.4000	0.5477
	5	1	5	0.0000	0.0000
	5	2	5	0.2000	0.4472
	5	3	5	0.6000	0.8944
	6	1	5	0.6000	0.5477
	6	2	5	0.2000	0.4472
	6	3	5	0.6000	0.5477

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	15.1556			
T (TRT)	5	2.6222	0.5244	3.496	0.0069
R (REP)	2	0.3556	0.1778	1.185	0.3093
TR	10	1.3778	0.1378	0.919	0.5248
Subj w Groups	72	10.8000	0.1500		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: glucarph Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.000	6	0.467
2	0.000		
3	0.067		
4	0.267		
5	0.267		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 = 2			
1 < 3			
1 < 4			
1 < 5			
1 < 6	0.0500	0.0228	0.0100
2 < 3			N.A.
2 < 4			N.A.
2 < 5			N.A.
2 < 6	0.0500	0.0228	N.A.
3 < 4			N.A.
3 < 5			N.A.
3 < 6	0.1000	0.0908	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 and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	0.133
2	0.133
3	0.267

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 - phytotoxicity data at day -21

Analysis of Variance File: gluletph Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

	Factors: T	R	Treatment HOE 039866 (lb ai/A)	N	Mean	S.D.
	*	*		90	0.7778	1.4361
	1	*	Control	15	0.0000	0.0000
	2	*	0.025	15	0.0000	0.0000
	3	*	0.05	15	0.0000	0.0000
	4	*	0.10	15	0.4000	0.5071
*	5	*	0.20	15	1.0000	1.6475
*	6	*	0.40	15	3.2667	1.1629
	*	1		30	0.6667	1.1842
	*	2		30	0.9000	1.6263
	*	3		30	0.7667	1.5013
	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	0.6000	0.5477
	4	2		5	0.0000	0.0000
	4	3		5	0.6000	0.5477
	5	1		5	1.2000	1.7889
	5	2		5	1.8000	2.0494
	5	3		5	0.0000	0.0000
	6	1		5	2.2000	1.3038
	6	2		5	3.6000	0.8944
	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	183.5556			
T (TRT)	5	123.0222	24.6044	42.179	0.0000
R (REP)	2	0.8222	0.4111	0.705	0.5012
TR	10	17.7111	1.7711	3.036	0.0029
Subj w Groups	72	42.0000	0.5833		

* Indicates significant effect ($p < 0.05$).

Analysis of Variance File: gluletph Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.000	6	3.267
2	0.000		
3	0.000		
4	0.400		
5	1.000		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 = 2			
1 = 3			
1 < 4			
1 < 5	0.0100	0.0094	0.0100
1 < 6	0.0100	0.0000	0.0100
2 = 3			N.A.
2 < 4			N.A.
2 < 5	0.0100	0.0094	N.A.
2 < 6	0.0100	0.0000	N.A.
3 < 4			N.A.
3 < 5	0.0100	0.0094	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	0.667
2	0.900
3	0.767

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 – phytotoxicity data at day 7.

Analysis of Variance File: gluletph Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T	R	Treatment HOE 039866 (lb ai/A)	N	Mean	S.D.
*	*		90	0.8111	1.2261
1	*	– Control	15	0.0000	0.0000
2	*	– 0.025	15	0.0000	0.0000
3	*	– 0.05	15	0.0000	0.0000
4	*	– 0.1	15	0.1333	0.5164
* 5	*	– 0.2	15	1.8667	0.7432
* 6	*	– 0.4	15	2.8667	0.6399
*	1		30	0.6667	1.0283
*	2		30	1.0333	1.4499
*	3		30	0.7333	1.1725
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	0.0000	0.0000
4	2		5	0.4000	0.8944
4	3		5	0.0000	0.0000
5	1		5	1.8000	0.8367
5	2		5	2.4000	0.5477
5	3		5	1.4000	0.5477
6	1		5	2.2000	0.4472
6	2		5	3.4000	0.5477
6	3		5	3.0000	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	133.7889			
T (TRT)	5	116.5889	23.3178	161.431	0.0000
R (REP)	2	2.2889	1.1444	7.923	0.0008
TR	10	4.5111	0.4511	3.123	0.0023
Subj w Groups	72	10.4000	0.1444		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: gluletph Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.000	6	2.867
2	0.000		
3	0.000		
4	0.133		
5	1.867		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 = 2			
1 = 3			
1 < 4			
1 < 5	0.0100	0.0000	0.0100
1 < 6	0.0100	0.0000	0.0100
2 = 3			N.A.
2 < 4			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	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	0.667
2	1.033
3	0.733

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2	0.0100	0.0012	0.0100
1 < 3			
2 > 3	0.0100	0.0094	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 onion - plant height data at day -21

Analysis of Variance File: gluoniht Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T	R	Treatment	N	Mean	S.D.
*	*	HOE 039866 (lb ai/A)	90	166.3667	30.4489
1	*	Control	15	172.8667	21.4405
2	*	0.025	15	176.0000	20.6121
3	*	0.05	15	162.5333	26.3814
4	*	0.1	15	170.2000	38.2047
5	*	0.2	15	172.1333	17.0498
* 6	*	0.4	15	144.4667	42.8650
*	1		30	160.2333	37.4273
*	2		30	169.2000	21.5605
*	3		30	169.6667	30.3512
1	1		5	185.0000	21.5058
1	2		5	166.4000	24.9459
1	3		5	167.2000	15.7385
2	1		5	162.2000	16.6193
2	2		5	174.4000	17.7848
2	3		5	191.4000	18.8892
3	1		5	149.6000	33.6497
3	2		5	162.0000	18.8680
3	3		5	176.0000	22.6164
4	1		5	171.2000	22.6650
4	2		5	186.8000	22.0613
4	3		5	152.6000	58.0973
5	1		5	172.8000	19.8796
5	2		5	168.0000	9.6437
5	3		5	175.6000	22.1878
6	1		5	120.6000	64.4345
6	2		5	157.6000	28.8149
6	3		5	155.2000	19.4216

Fmax for testing homogeneity of between subjects variances: 44.64
Number of variances= 18 df per variance= 4.

Analysis of Variance Dependent variable: HT

Source	df	SS (H)	MSS	F	P
Between Subjects	89	82514.8830			
T (TRT)	5	10159.5674	2031.9135	2.439	0.0420
R (REP)	2	1696.0667	848.0333	1.018	0.3639
TR	10	10670.8662	1067.0867	1.281	0.2558
Subj w Groups	72	59988.3830	833.1720		

* Indicates significant effect ($p < 0.05$)

Analysis of Variance File: gluoniht Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	172.867	6	144.467
2	176.000		
3	162.533		
4	170.200		
5	172.133		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 > 3			
1 > 4			
1 > 5			
1 > 6	0.1000		**0.0500**
2 > 3			N.A.
2 > 4			N.A.
2 > 5			N.A.
2 > 6	0.0500	0.0571	N.A.
3 < 4			N.A.
3 < 5			N.A.
3 > 6			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 and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	160.233
2	169.200
3	169.667

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 for day 21

Analysis of Variance File: glutomht Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T	R	Treatment HOE 039866 (lb ai/A)	N	Mean	S.D.
*	*		90	95.3667	17.2056
1	*	- Control	15	101.6667	14.8548
2	*	- 0.025	15	100.7333	16.9135
3	*	- 0.05	15	96.2000	12.4683
4	*	- 0.1	15	92.3333	13.4519
5	*	- 0.2	15	96.2667	22.9362
* 6	*	- 0.4	15	85.0000	17.6837
*	1		30	95.2667	19.2388
*	2		30	96.1000	16.9285
*	3		30	94.7333	15.8374
1	1		5	101.8000	10.1833
1	2		5	101.6000	15.0765
1	3		5	101.6000	21.0071
2	1		5	96.2000	17.9917
2	2		5	115.0000	13.9284
2	3		5	91.0000	9.2195
3	1		5	96.8000	12.2760
3	2		5	97.8000	18.7936
3	3		5	94.0000	5.5227
4	1		5	93.4000	14.6901
4	2		5	84.8000	15.7226
4	3		5	98.8000	6.7602
5	1		5	108.2000	28.2966
5	2		5	87.4000	6.6182
5	3		5	93.2000	26.6214
6	1		5	75.2000	17.7398
6	2		5	90.0000	14.9499
6	3		5	89.8000	19.3959

Fmax for testing homogeneity of between subjects variances: 26.25
Number of variances= 18 df per variance= 4.

Analysis of Variance Dependent variable: HT

Source	df	SS (H)	MSS	F	P
Between Subjects	89	26346.9023			
T (TRT)	5	2799.9668	559.9934	2.063	0.0793
R (REP)	2	28.4667	14.2333	0.052	0.9493
TR	10	3975.6665	397.5667	1.465	0.1694
Subj w Groups	72	19542.8027	271.4278		

* Indicates significant effect @ $p < 0.05$.

Analysis of Variance File: glutomht Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	101.667	6	85.000
2	100.733		
3	96.200		
4	92.333		
5	96.267		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4			
1 > 5			
1 > 6	0.1000		0.0500
2 > 3			N.A.
2 > 4			N.A.
2 > 5			N.A.
2 > 6			N.A.
3 > 4			N.A.
3 < 5			N.A.
3 > 6			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 and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	95.267
2	96.100
3	94.733

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 at day 21

Analysis of Variance File: glucabht Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment - HOE 039866 (lbai/A)

Factors: T	R	N	Mean	S.D.
*	*	90	73.1444	8.2660
1	* - Control	15	76.2000	6.0142
2	* - 0.025	15	74.8000	8.8253
3	* - 0.05	15	72.8667	7.7724
4	* - 0.1	15	71.9333	11.7258
5	* - 0.2	15	72.9333	5.4441
6	* - 0.4	15	70.1333	8.2710
*	1	30	71.8000	8.7075
*	2	30	74.1333	8.4148
*	3	30	73.5000	7.7493
1	1	5	78.2000	5.9330
1	2	5	73.2000	3.5637
1	3	5	77.2000	7.8230
2	1	5	73.8000	6.4962
2	2	5	81.4000	8.4735
2	3	5	69.2000	7.9812
3	1	5	70.4000	8.1731
3	2	5	78.6000	5.2249
3	3	5	69.6000	7.4364
4	1	5	65.2000	14.0961
4	2	5	76.0000	10.7935
4	3	5	74.6000	8.9331
5	1	5	72.0000	6.4420
5	2	5	70.2000	3.8987
5	3	5	76.6000	4.4497
6	1	5	71.2000	7.1903
6	2	5	65.4000	7.6681
6	3	5	73.8000	9.0940

Fmax for testing homogeneity of between subjects variances: 15.65
Number of variances= 18 df per variance= 4.

Analysis of Variance Dependent variable: HT

Source	df	SS (H)	MSS	F	P
Between Subjects	89	6081.1221			
T (TRT)	5	340.9889	68.1978	1.115	0.3570
R (REP)	2	87.3555	43.6778	0.714	0.4967
TR	10	1249.1777	124.9178	2.042	0.0407
Subj w Groups	72	4403.6001	61.1611		

Analysis of Variance File: glucabht Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	76.200	6	70.133
2	74.800		
3	72.867		
4	71.933		
5	72.933		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4			
1 > 5			
1 > 6			
2 > 3			N.A.
2 > 4			N.A.
2 > 5			N.A.
2 > 6			N.A.
3 > 4			N.A.
3 < 5			N.A.
3 > 6			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 and only for comparisons with the control mean (level 1).

Post-hoc tests for factor R (REP)

Level	Mean
1	71.800
2	74.133
3	73.500

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 height data at day -21

Analysis of Variance File: gluletht Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Treatment - HOE 039866 (lb ai/A)

Factors: T	R	N	Mean	S.D.
*	*	90	43.2333	20.2463
1	* - Control	15	47.8000	7.1234
2	* - 0.025	15	57.0000	6.9282
3	* - 0.05	15	55.8000	6.4829
4	* - 0.1	15	49.4000	9.2721
5	* - 0.2	15	39.0667	21.5952
* - 6	* - 0.4	15	10.3333	17.2944
*	1	30	44.8667	16.7759
*	2	30	41.8000	23.3569
*	3	30	43.0333	20.6422
1	1	5	48.6000	4.0373
1	2	5	41.4000	7.1624
1	3	5	53.4000	4.3359
2	1	5	58.8000	10.7564
2	2	5	58.0000	3.5355
2	3	5	54.2000	4.9699
3	1	5	52.4000	6.1887
3	2	5	58.2000	5.3572
3	3	5	56.8000	7.5631
4	1	5	44.4000	6.4265
4	2	5	56.6000	10.5736
4	3	5	47.2000	6.7602
5	1	5	38.8000	23.8893
5	2	5	31.8000	29.3462
5	3	5	46.6000	7.9561
6	1	5	26.2000	21.0998
6	2	5	4.8000	10.7331
6	3	5	0.0000	0.0000

Fmax for testing homogeneity of between subjects variances: Not defined

Analysis of Variance Dependent variable: HT

Source	df	SS (H)	MSS	F	P
Between Subjects	89	36482.0980			
T (TRT)	5	22591.4355	4518.2871	31.067	0.0000
R (REP)	2	142.8667	71.4333	0.491	0.6167
TR	10	3276.2000	327.6200	2.253	0.0235
Subj w Groups	72	10471.5957	145.4388		

* Indicates significant effect @ $p < 0.05$.

Analysis of Variance File: glulotht Date: 06-08-1990

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	47.800	6	10.333
2	57.000		
3	55.800		
4	49.400		
5	39.067		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 < 3			
1 < 4			
1 > 5			
1 > 6	0.0100	0.0000	0.0100
2 > 3			N.A.
2 > 4			N.A.
2 > 5	0.0100	0.0019	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4			N.A.
3 > 5	0.0100	0.0047	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	44.867
2	41.800
3	43.033

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 - plant dry weight for day -21

Analysis of Variance File: glucucdw Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T	Treatment HOE 039866 (lb ai/A)	N	Mean	S.D.
*		18	210.4444	24.7914
1	- Control	3	243.3333	20.8407
2	- 0.025	3	215.6667	9.2916
3	- 0.05	3	221.3333	14.5717
4	- 0.1	3	208.6667	10.6927
* 5	- 0.2	3	197.3333	21.9393
* 6	- 0.4	3	176.3333	6.8069

Fmax for testing homogeneity of between subjects variances: 10.39
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	10448.4443			
T (TRT)	5	7698.4443	1539.6888	6.719	0.0033
Subj w Groups	12	2750.0000	229.1667		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	243.333	6	176.333
2	215.667		
3	221.333		
4	208.667		
5	197.333		

* Indicates significant effect @ $p < 0.05$.

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4			
1 > 5	0.0500	0.0444	0.0500
1 > 6	0.0100	0.0026	0.0100
2 < 3			N.A.
2 > 4			N.A.
2 > 5			N.A.
2 > 6	0.1000		N.A.
3 > 4			N.A.
3 > 5			N.A.
3 > 6	0.0500	0.0513	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 Bonferroni only the P-values .05 and .01 are possible

ANOVA : for cabbage plant dry weight for day -21

Analysis of Variance File: glucabdw Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T (Treatment HOE 039866 16 ai/A)	N	Mean	S.D.
*	18	102.6667	25.7476
1 - Control	3	121.3333	17.5594
2 - 0.025	3	119.0000	10.5357
3 - 0.05	3	77.0000	53.6749
4 - 0.1	3	110.6667	3.0551
5 - 0.2	3	99.0000	3.0000
6 - 0.4	3	89.0000	3.0000

Fmax for testing homogeneity of between subjects variances: 320.11
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	11270.0020			
T (TRT)	5	4614.6675	922.9335	1.664	0.2160
Subj w Groups	12	6655.3345	554.6112		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	121.333	6	89.000
2	119.000		
3	77.000		
4	110.667		
5	99.000		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4			
1 > 5			
1 > 6			
2 > 3			N.A.
2 > 4			N.A.
2 > 5			N.A.
2 > 6			N.A.
3 < 4			N.A.
3 < 5			N.A.
3 < 6			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.

ANOVA : for soybean - plant dry weight for day-21

Analysis of Variance File: glusoydw Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T (Treatment HOE 039866 (lb ai/A))	N	Mean	S.D.
*	18	456.4445	62.3918
1 - Control	3	508.0000	53.5070
2 - 0.025	3	478.3333	50.5404
3 - 0.05	3	473.0000	26.0576
4 - 0.1	3	487.0000	27.5136
5 - 0.2	3	437.3333	52.2047
* - 6 - 0.4	3	355.0000	31.7490

Fmax for testing homogeneity of between subjects variances: 4.22
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	66176.4450			
T (TRT)	5	45003.1130	9000.6230	5.101	0.0097
Subj w Groups	12	21173.3320	1764.4443		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	508.000	6	355.000
2	478.333		
3	473.000		
4	487.000		
5	437.333		

* - indicates significant effect @ $p < 0.05$

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4			
1 > 5			
1 > 6	0.0100	0.0121	0.0100
2 > 3			N.A.
2 < 4			N.A.
2 > 5			N.A.
2 > 6	0.0500	0.0557	N.A.
3 < 4			N.A.
3 > 5			N.A.
3 > 6	0.0500	0.0739	N.A.
4 > 5			N.A.
4 > 6	0.0500	0.0353	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 Bonferroni only the P-values .05 and .01 are possible

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

Analysis of Variance File: gluletdw Date: 06-08-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors:	T	Treatment-	N	Mean	S.D.
	*	HOE 039866 (16 ai/A)	18	74.9444	32.1146
	1	- Control	3	88.0000	12.0000
	2	- 0.025	3	110.6667	16.1967
	3	- 0.05	3	104.6667	4.5092
	4	- 0.1	3	67.3333	11.0151
*	5	- 0.2	3	54.3333	12.5831
*	6	- 0.4	3	24.6667	7.0238

Fmax for testing homogeneity of between subjects variances: 12.90
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	17532.9453			
T (TRT)	5	16021.6113	3204.3223	25.442	0.0000
Subj w Groups	12	1511.3340	125.9445		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	88.000	6	24.667
2	110.667		
3	104.667		
4	67.333		
5	54.333		

* Indicate significant effect @ p<0.05.

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 < 3			
1 > 4			
1 > 5	0.0500	0.0483	0.0500
1 > 6	0.0100	0.0003	0.0100
2 > 3			N.A.
2 > 4	0.0100	0.0077	N.A.
2 > 5	0.0100	0.0009	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4	0.0500	0.0236	N.A.
3 > 5	0.0100	0.0023	N.A.
3 > 6	0.0100	0.0000	N.A.
4 > 5			N.A.
4 > 6	0.0100	0.0087	N.A.
5 > 6	0.1000		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.

ANOVA: for ryegrass - plant dry weight @ day 21
Conc. Range = 0.0025 → 0.04

Analysis of Variance File: gluryedw Date: 06-11-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T Treatment HOE 039866 (lb ai/A)	N	Mean	S.D.
*	18	57.4444	16.4468
1 - Control 0	3	54.3333	16.5025
2 - 0.0025	3	70.0000	31.7962
3 - 0.005	3	60.0000	7.9373
4 - 0.01	3	51.0000	2.0000
5 - 0.02	3	44.6667	12.6623
6 - 0.04	3	64.6667	11.9304

Fmax for testing homogeneity of between subjects variances: 252.75
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	4598.4443			
T (TRT)	5	1292.4443	258.4889	0.938	0.4944
Subj w Groups	12	3306.0000	275.5000		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	54.333	6	64.667
2	70.000		
3	60.000		
4	51.000		
5	44.667		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 < 3			
1 > 4			
1 > 5			
1 < 6			
2 > 3			N.A.
2 > 4			N.A.
2 > 5			N.A.
2 > 6			N.A.
3 > 4			N.A.
3 > 5			N.A.
3 < 6			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 ryegrass - plant dry weight @ day-21
Conc. Range: 0.025 → 0.4

Analysis of Variance File: gluryedw Date: 06-11-1990

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors:	T	Treatment HOE 039866 (lb ai/A)	N	Mean	S.D.
	*		18	52.2222	6.7349
	1	- Control (0)	3	63.3333	4.7258
*	2	- 0.025	3	46.6667	4.0415
*	3	- 0.05	3	52.3333	3.7859
*	4	- 0.1	3	51.3333	2.3094
*	5	- 0.2	3	51.3333	6.0277
*	6	- 0.4	3	48.3333	5.8595

Fmax for testing homogeneity of between subjects variances: 6.81
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: DW

Source	df	SS (H)	MSS	F	P
Between Subjects	17	771.1112			
T (TRT)	5	513.1111	102.6222	4.773	0.0123
Subj w Groups	12	258.0001	21.5000		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	63.333	6	48.333
2	46.667		
3	52.333		
4	51.333		
5	51.333		

* Indicates significant effect @ p < 0.05

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2	0.0100	0.0134	0.0100
1 > 3			0.0500
1 > 4	0.1000		0.0500
1 > 5	0.1000		0.0500
1 > 6	0.0500	0.0288	0.0100
2 < 3			N.A.
2 < 4			N.A.
2 < 5			N.A.
2 < 6			N.A.
3 > 4			N.A.
3 > 5			N.A.
3 > 6			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.

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

D11: READY

	A	B	C	D	E	F	G	H
1								
2	glu/lettuce/plant height/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	19	-1.60	4.12				
7	0.05	17	-1.30	4.05				
8	0.1	2	-1.00	2.95				
9	0.2	-19	-0.70	4.12				
10	0.4	-79	-0.40	5.81				
11								
12		Regression Output:						
13	Constant			-89.1815				
14	Std Err of Y Est			19.57573				
15	R Squared			0.824108				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	-77.2292						
20	Std Err of Coef.	20.59926						

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Regression analysis : $Y = a + bX$

$Y = -89.18 + (-77.23X)$

Calculated $EC_{50} = 0.31$ lb ai/A

Calculated $EC_{25} = 0.15$ lb ai/A

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

D11: READY

	A	B	C	D	E	F	G	H
1								
2	glu/tomato/plant height/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	-1	-1.60	2.67				
7	0.05	-6	-1.30	3.45				
8	0.1	-10	-1.00	3.72				
9	0.2	-6	-0.70	3.45				
10	0.4	-17	-0.40	4.05				
11								
12		Regression Output:						
13	Constant			4.385588				
14	Std Err of Y Est			0.304610				
15	R Squared			0.732260				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	0.918155						
20	Std Err of Coef.	0.320537						
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Regression Equation = $Y = a + bX$

$Y = 4.39 + 0.92X$

Calculated EC_{50} = 4.60 lb ai/A

Calculated EC_{25} = 0.86 lb ai/A

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

D11: READY

	A	B	C	D	E	F	G	H
1								
2	glu/onion/plant height/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	2	-1.60					
7	0.05	-6	-1.30	3.45				
8	0.1	-2	-1.00	2.95				
9	0.2	-1	-0.70	2.67				
10	0.4	-17	-0.40	4.05				
11								
12		Regression Output:						
13	Constant			3.710013				
14	Std Err of Y Est			0.702447				
15	R Squared			0.105127 *				
16	No. of Observations			4				
17	Degrees of Freedom			2				
18								
19	X Coefficient(s)	0.506358						
20	Std Err of Coef.	1.044636						

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Regression Equation : $Y = a + bX$

$Y = 3.71 + 0.51X$

Calculated EC_{50} = 338.39 lb ai/A

Calculated EC_{25} = 1.22 lb ai/A

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

D11: READY

	A	B	C	D	E	F	G	H
1								
2	glu/cabbage/plant height/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	-1	-1.60	2.67				
7	0.05	-4	-1.30	3.25				
8	0.1	-5	-1.00	3.36				
9	0.2	-4	-0.70	3.25				
10	0.4	-8	-0.40	3.59				
11								
12	Regression Output:							
13	Constant			3.835718				
14	Std Err of Y Est			0.201960				
15	R Squared			0.734405				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	0.612096						
20	Std Err of Coef.	0.212520						

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Regression Equation = $Y = a + bX$

$Y = 3.84 + 0.61X$

Calculated EC_{50} = 79.73 lb ai/A

Calculated EC_{25} = 6.36 lb ai/A

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

D1: READY

	A	B	C	D	E	F	G	H
1								
2	glu/soybean/dry weight/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	-6	-1.60	3.45				
7	0.05	-7	-1.30	3.52				
8	0.1	-4	-1.00	3.25				
9	0.2	-14	-0.70	3.92				
10	0.4	-30	-0.40	4.48				
11								
12		Regression Output:						
13	Constant			4.542633				
14	Std Err of Y Est			0.339290				
15	R Squared			0.636973				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	0.819139						
20	Std Err of Coef.	0.357030						

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Regression Equation : $Y = a + bX$

$Y = 4.54 + 0.82X$

Calculated EC_{50} = 3.64 lb ai/A

Calculated EC_{25} = 0.55 lb ai/A

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

D11: READY

	A	B	C	D	E	F	G	H
1								
2	glu/lettuce/dry weight/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	26	-1.60					
7	0.05	19	-1.30					
8	0.1	-23	-1.00	4.26				
9	0.2	-38	-0.70	4.69				
10	0.4	-72	-0.40	5.58				
11								
12		Regression Output:						
13	Constant			6.375805				
14	Std Err of Y Est			0.187794				
15	R Squared			0.961094				
16	No. of Observations			3				
17	Degrees of Freedom			1				
18								
19	X Coefficient(s)	2.192472						
20	Std Err of Coef.	0.441120						

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Regression Equation : $Y = a + bX$

$Y = 6.38 + 2.19X$

Calculated EC_{50} = 0.23 lb ai/A

Calculated EC_{25} = 0.12 lb ai/A

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

D11: READY

	A	B	C	D	E	F	G	H
1								
2	glu/cucumber/dry weight/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	-11	-1.60	3.77				
7	0.05	-9	-1.30	3.66				
8	0.1	-14	-1.00	3.92				
9	0.2	-19	-0.70	4.12				
10	0.4	-28	-0.40	4.42				
11								
12		Regression Output:						
13	Constant			4.563465				
14	Std Err of Y Est			0.133346				
15	R Squared			0.853159				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	0.585827						
20	Std Err of Coef.	0.140318						

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Regression Equation : $Y = a + bX$

$Y = 4.56 + 0.59X$

Calculated EC_{50} = 5.56 lb ai/A

Calculated EC_{25} = 0.41 lb ai/A

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

D11: READY

	A	B	C	D	E	F	G	H
1								
2	glu/cabbage/dry weight/21-day							
3								
4	TRT(conc)	%effect	log conc	probit(%effect)				
5	0							
6	0.025	-2	-1.60	2.95				
7	0.05	-36	-1.30	4.64				
8	0.1	-8	-1.00	3.59				
9	0.2	-18	-0.70	4.08				
10	0.4	-26	-0.40	4.38				
11								
12		Regression Output:						
13	Constant			4.675460				
14	Std Err of Y Est			0.652359				
15	R Squared			0.285679				
16	No. of Observations			5				
17	Degrees of Freedom			3				
18								
19	X Coefficient(s)	0.751925						
20	Std Err of Coef.	0.686468						

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Regression Equation : $Y = a + bX$

$Y = 4.68 + 0.75X$

Calculated EC_{50} = 2.75 lb ai/A

Calculated EC_{25} = 0.34 lb ai/A