Ignite / T/R 00 4 / 128850

12/24/90 MRID No. 413961-11

DATA EVALUATION RECORD

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

2. **TEST MATERIAL:** HOE 039866 (Ignite Technical); Ammonium-DL-homoalanin-4yl(methyl)phosphinate; CAS No. 77182-82-2; 96.2% active ingredient; a white powder.

3. **STUDY TYPE:** Non-target plants: Seed Germination/Seedling Emergence Phytotoxicity Tests - Tier II. Species tested: Soybean, Lettuce, Carrot, Tomato, Cucumber, Cabbage, Oat, Ryegrass, Corn and Onion.

4. **CITATION:** Chetram, R.S. 1990. HOE 039866: Tier II Seed Germination/Seedling Emergence Nontarget Phytotoxicity Test. Conducted by Pan-Agricultural Laboratories, Inc., Madera, CA. PAL Project No. LR 89-15B. Submitted by Hoechst Celanese Corporation, Somerville, NJ. EPA MRID No. 413961-11.

5. **REVIEWED BY:**

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

Signature: P. Kosalwat
Date: 6/18/90

6. **APPROVED BY:**

Michael L. Whitten, M.S.
Wildlife Toxicologist
KBN Engineering and
Applied Sciences, Inc.

Signature: Michael L. Whitten
Date: 6-19-90

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

Signature: R.C Cetnis
Date: 12/20/90

M. Reynolds 12/24/90

36 hours

1

7. **CONCLUSIONS:**

Seed Germination: This study is scientifically sound and fulfills the guideline requirements for a Tier-II seed germination toxicity test using non-target plants. Information obtained from EEB indicates that the maximum application rate for this pesticide is between 0.75 and 1.5 lb ai/A. The highest application rate used in this study was 1.0 lb ai/A.

Radicle length was generally more sensitive to HOE 039866 than percent germination. Based on percent germination, the NOEC values ranged from 0.0375 lb ai/A (carrot and onion) to 1.0 lb ai/A (soybean, cucumber, oat, and corn). EC25 values for percent germination of carrot and onion were <0.4 lb ai/A, while EC50 values were <1.5 lb ai/A. No dose-response relationship was observed for the other eight species. Based on radicle length, the NOEC values ranged from 0.003 lb ai/A (tomato) to 1.0 lb ai/A (soybean, cucumber, oat, and corn). Tomato radicle length was the most sensitive parameter with an NOEC and EC25 of 0.003 and 0.007 lb ai/A, respectively. Radicle length of soybean, cucumber, and oat did not show any dose response to HOE 039866. EC25 values for the other seven species were <0.5 lb ai/A. EC50 values for lettuce, carrot, tomato, and onion were <0.5 lb ai/A. The study results indicate that a Tier-III study is required.

Seedling Emergence: The study is scientifically sound and fulfills the guideline requirements for a Tier-II seedling emergence toxicity test using non-target plants.

Based on phytotoxicity rating, the NOEC values ranged from 0.094 lb ai/A (cucumber) to 1.5 lb ai/A (lettuce and oat). Concentrations up to the maximum application rate of 1.5 lb ai/A did not have any effect on the percentage of emerged seedlings of all plant species, except onion. Percentage of emerged seedlings of ryegrass had EC25 and EC50 greater than 1.5 lb ai/A. NOEC, EC25, and EC50 for onion, the most sensitive species for this parameter, were 0.375, 0.846, and 2.63 lb ai/A, respectively.

Based on plant height, the NOEC values ranged from 0.188 lb ai/A (ryegrass, the most sensitive species) to 0.75 lb ai/A (soybean, cucumber, and oat). EC25 values for all plant species were <1.5 lb ai/A. EC50 values for carrot, tomato, cabbage, ryegrass, corn, and onion were <1.5 lb ai/A, while those for soybean, lettuce, cucumber, and oat were >1.5 lb ai/A.

Based on plant dry weight, lettuce, carrot, tomato, and cabbage had the lowest NOEC (0.188 lb ai/A). However, only lettuce and cabbage had a similar EC25 value (~ 0.16 lb ai/A) and appear to be the most sensitive species, based on dry weight. Onion was the least sensitive species with an NOEC and EC25 of 1.5 and 1.12 lb ai/A, respectively.

The study results indicate that a Tier-III study is required.

8. **RECOMMENDATIONS:** A Tier-III study should be conducted for all plant species tested.

9. **BACKGROUND:**

10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A.

11. **MATERIALS AND METHODS:**

A. **Test Species:** Dicotyledon plants were represented by six species from six families (i.e., soybean, lettuce, carrot, tomato, cucumber, and cabbage), while monocotyledon plants were represented by four species from two families (i.e. oat, ryegrass, corn, and onion). Cultivars, lot number, and germination ratings were provided in the report.

B. **Test System:**

Seed Germination: Two circles of blue blotter filter paper (87.5 mm) were placed in the bottom of a glass petri plate (100 x 15 mm). The test solutions were prepared with water from a well located at the testing facility. Fifteen milliliters of the test solution were pipetted into plates for soybean, cucumber, oat, and corn. Ten milliliters were pipetted into plates for lettuce, carrot, tomato, cabbage, ryegrass, and onion.

After the test solution was absorbed into the blotter, ten seeds of each plant species were added to each petri plate. Petri plates were placed in plastic boxes (12.25 x 9.0 x 4.1 inches) and covered with tight lids to prevent moisture loss. The petri plates containing lettuce seeds were incubated in the dark at 18 $\pm$ 1°C for seven days, while the remaining test species were incubated at 25°C.

Seedling Emergence: Seeds of each crop were planted in plastic pots (7.5 x 7.5 x 6.0 cm), filled with

sterilized sandy loam soil. A plexiglass template was used to create planting holes in the soil, thus allowing for uniform planting depth and seed distribution of the ten seeds planted per pot. An analysis of the soil was provided in the report. Each treatment replicate (one pot of each plant species) was placed on an aluminum tray (6.125 x 31.125 cm). The spray plot was 3.21 x 1.67 feet for an area of 5.36 ft^2.

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. All applications were performed indoors with a belt sprayer enclosed in a fume-hood and equipped with a single nozzle. A nozzle height of 12 inches and a nozzle pressure of 50 psi were used. The soil surface was sprayed at the equivalent of 468 L/ha (50 gpa) of water.

The pots were watered three times a day and a total of 19 ml of water was used to irrigate each pot per day. Temperature, relative humidity, photoperiod, and illuminance during the period of growth were provided in the report.

C. **Dosage:** Treatment application rates were adjusted for the percent purity of the test material (96.2%).

Seed Germination: Treatment application rates were 0, 0.019, 0.0375, 0.075, 0.15, and 0.3 lb ai/A for all plant species. In addition, a study continuation with treatment rates of 0.0625, 0.125, 0.25, 0.5, and 1.0 lb ai/A were conducted to obtain a dose response and calculated EC25 and EC50 values for soybean, cucumber, oat, and corn seed germination. Also, to obtain a no-observed-effect concentration (NOEC) for tomato, the following rates were tested: 0.00019, 0.00038, 0.00075, 0.0015, and 0.003 lb ai/A.

Seedling Emergence: HOE 039866 was applied to all ten plant species at the rates of 0, 0.09, 0.38, 0.75, and 1.5 lb ai/A. The test spray solution of 3.5952 gm ai/L (3595.2 ppm) was prepared by adding 747.4 mg of HOE 039866 in 200 ml deionized water. Serial dilutions were made of the maximum application solution to achieve the lower application rates.

D. **Design:**

Seed Germination: Each treatment/crop combination was

replicated three times (i.e., 10 seeds/plate, 3 plates/treatment). The test was terminated after six days for soybean, cucumber, oat, and corn due to their vigorous growth. The test for the remaining species (lettuce, carrot, tomato, cabbage, ryegrass, and onion) was terminated after 7 days. At test termination, the geminated seeds were removed from the petri plates and the radicle lengths were measured to the nearest millimeter. Percent seed germination and mean radicle length for all germinated seeds were calculated. Seeds were considered germinated if the radicle was ≥5 mm in length.

Seedling Emergence: Each crop/treatment combination was replicated three times (i.e., 10 seeds/pot, 3 pots/treatment level). After treatment, the pots were randomized within crops and among treatments and placed in an on-site greenhouse. The study was terminated 21 days after treatment for all species except lettuce and carrot, which was terminated after 28 days for maximum emergence and growth.

The percentage of the ten seeds planted in each pot which emerged was calculated for each treatment. Seedling height and phytotoxicity ratings were recorded at 7, 14, and 21 days (28 days for lettuce and carrot) after treatment. Twenty-one days after treatment (28 days for lettuce and carrot), the plants within treatment replicates (pots) were cut at the 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.

The phytotoxicity ratings evaluated five observable toxic effects: 0-indicates no injury or effect; 1-indicates slight plant effect or restriction to one area of the plant; 2-indicates a moderate effect engrossing the whole plant (e.g., mild stunting, chlorosis); 3-indicates a severe effect (severe leaf desiccation); and 4-indicates a total effect or plant death.

E. Statistics:

Mean and Percent Effect Calculation: All data were entered into a Lotus 1-2-3 spreadsheet. The spreadsheet calculated replicate means, treatment means, standard deviations, and analysis of variance tables. Treatment means were used to calculate the percent detrimental effect resulting from the

treatment. The percent effect was calculated using the following equation:

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

Analysis of Variance: An analysis of variance table was constructed using the Lotus 1-2-3 raw data spreadsheet. A one-way analysis of variance (ANOVA) model for data with equal subsamples was used to analyze data from the seed germination (radicle length and percent germination) and seedling emergence (percent emergence) tests. A one-way ANOVA model for data with unequal subsamples was used to analyze the seedling height data and phytotoxicity rating data. Treatment mean separation was achieved using either SAS or the Lotus 1-2-3 spreadsheet. All significant differences were determined at $p < 0.05$.

Probit Analysis: The percent detrimental effect values were entered into a SAS probit analysis program to calculate EC50 values.

12. **REPORTED RESULTS:**

Seed Germination: Table A (attached) summarizes the lowest values of NOEC, EC25, and EC50, along with the parameters in which these concentrations were observed. Detailed results for each specific parameter are described below. NOEC, EC25, and EC50 values for radicle length are summarized in Table 6 (attached) and the values for percent germination are in Table 7 (attached).

Radicle length: Soybean, cucumber, oat, and corn were the least sensitive to HOE 039866 while tomato was the most sensitive. Crops listed (with corresponding NOEC values in lb ai/A) in order of increasing sensitivity to HOE 039866 based on radicle length NOECs are as follows:

Soybean = cucumber = oat = corn (1.0) < ryegrass (0.3) < cabbage (0.15) < carrot (0.075) < lettuce = onion (0.019) < tomato (0.003).

Since a dose response was not evident on radicle length of soybean and oat, a probit analysis could not be conducted to determine EC25 and EC50 values. Probit analysis of the radicle length data showed that cucumber was the least sensitive plant species while **"tomato was the most sensitive."** Crops listed (with corresponding EC50 values in lb ai/A) in order of increasing sensitivity to HOE 039866

based on radicle length EC50 values are as follows:

Cucumber (2710) < cabbage (746) < corn (14.2) < ryegrass (6.98) < tomato (0.417) < carrot (0.246) < lettuce (0.203) < onion (0.182).

Percent germination: Crops listed (with corresponding NOEC values in lb ai/A) in order of increasing sensitivity to HOE 039866 based on percent germination no-effect concentration values are as follows:

Soybean = cucumber = oat = corn (1.0) < lettuce = tomato = ryegrass (0.3) < cabbage (0.15) < carrot = onion (0.0375).

Since a dose response was not evident on percent germination of soybean, tomato, cucumber, oat, ryegrass, lettuce, cabbage, and corn, a probit analysis could not be conducted to determine EC25 and EC50 values. Probit analysis of the percent germination data for the other two crops showed that carrot (EC50 = 0.806 lb ai/A) was more sensitive than onion (EC50 = 1.28 lb ai/A).

Seedling Emergence: Table B (attached) lists the lowest values of NOEC, EC25, and EC50, along with the parameters in which these concentrations were observed. Detailed results for each specific parameter are described below. NOEC, EC25, and EC50 for each species were presented in Table 28 (attached) for phytotoxicity rating, Table 29 (attached) for percentage of emerged seedlings, Table 30 (attached) for plant height, and Table 31 (attached) for plant dry weight.

Phytotoxicity rating: Treatment with HOE 039866 resulted in a significant phytotoxic effect to cucumber at 0.188 lb ai/A; to carrot, onion, and ryegrass at 0.375 lb ai/A; and to soybean and tomato at 1.5 lb ai/A. Two crops, lettuce and oat, exhibited no significant phytotoxic symptoms at any rate of HOE 039866 at the final observation period. Crops listed (with corresponding NOEC values in lb ai/A) in order of increasing sensitivity to HOE 039866 based on the 21 or 28 day phytotoxicity rating NOEC values are as follows:

Oat = lettuce (1.5) < tomato= soybean (0.75) < cabbage = corn (0.375) < carrot = ryegrass = onion (0.188) < cucumber (0.094).

Percent seedling emergence: Treatment of the soil surface with HOE 039866 at a concentration of 0.750 lb ai/A resulted in a significant effect on percent emergence of onion at day-21 observation period. Crops listed (with corresponding NOEC values in lb ai/A) in order of increasing sensitivity

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to HOE 039866 based on percent emergence NOEC values are as follows:

Soybean = lettuce = carrot = tomato = cucumber = cabbage = oat = ryegrass = corn (1.5) < onion (0.375).

Since a dose response was not evident on percent emergence of soybean, lettuce, carrot, tomato, cucumber, cabbage, oat, and corn, a probit analysis could not be conducted to determine EC25 and EC50 values. Probit analysis of the seedling emergence data for ryegrass and onion showed ryegrass had an EC50 value of 42.4 lb ai/A and onion an EC50 value of 2.63 lb ai/A.

Plant height: Treatment of the soil surface with HOE 039866 at a concentration of 0.375 lb ai/A resulted in a significant decrease in the height of ryegrass at day-21 observation period. Although this concentration resulted in a decrease of 27% and 29% in the height of onion and cabbage, respectively, the results were not significant due to variability between replicates. Treatment with HOE 039866 at a concentration of 0.75 lb ai/A resulted in a significant decrease in the height of lettuce, carrot, tomato, cabbage, corn, and onion at day-21 observation period. Treatment at the maximum concentration of 1.5 lb ai/A was required to produce a significant effect in the height of soybean, cucumber, and oat at day-21 observation period. Crops listed (with corresponding NOEC values in lb ai/A) in order of increasing sensitivity to HOE 039866 based on plant height NOEC values are as follows:

Soybean = cucumber = oat (0.75) < lettuce = carrot =tomato = cabbage = corn = onion (0.375) < ryegrass (0.188).

A dose response in plant height was evident in all plant species. Probit analysis of the plant height data showed that soybean was the least sensitive to HOE 039866 while onion was the most sensitive. Crops listed (with corresponding EC50 values in lb ai/A) in order of increasing sensitivity to HOE 039866 based on plant height EC50 values are as follows:

Soybean (5.87) < cucumber (5.14) < oat (2.56) < lettuce (2.45) < tomato (1.46) < corn (1.04) < carrot (0.705) < cabbage (0.698) < ryegrass (0.679) < onion (0.417).

Plant dry weight: Treatment of the soil surface with HOE 039866 at a concentration of 0.375 lb ai/A resulted in a significant effect on plant dry weight of lettuce, tomato, and cabbage. Treatment with HOE 039866 at a concentration

of 0.750 lb ai/A resulted in a significant effect on dry weight of carrot, cucumber, and ryegrass. Treatment with the maximum concentration of 1.5 lb ai/A resulted in a significant effect on dry weight of soybean, oat, and corn. Only onion showed no significant effect at any rate. Although lettuce exhibited a 29% decrease in plant dry weight at a concentration of 0.188 lb ai/A and onion a 27% decrease in dry weight at 1.5 lb ai/A, these results were not statistically significant due to the variability in plant dry weight between replications.

Results of the plant dry weight data showed that onion was the least sensitive to HOE 039866 while lettuce, carrot, tomato, and cabbage were the most sensitive. Crops listed (with corresponding NOEC values in lb ai/A) in order of increasing sensitivity to HOE 039866 based on dry weight NOEC values are as follows:

Onion (1.5) < soybean = oat (0.75) < cucumber = ryegrass = corn (0.375) < lettuce = carrot = tomato = cabbage (0.188).

All plant species exhibited a plant dry weight dose response. Probit analysis of the plant dry weight data showed that onion was the least sensitive to HOE 039866 while cabbage was the most sensitive. Crops listed (with corresponding EC50 values in lb ai/A) in order of increasing sensitivity to HOE 039866 based on plant dry weight EC50 values are as follows:

Onion (5.5) < soybean (3.95) < oat (1.52) < ryegrass (1.47) < corn (1.31) < cucumber (1.02) < tomato (1.0) < carrot (0.834) < lettuce (0.592) < cabbage (0.397).

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** No conclusions were made by the author. A quality assurance statement was included in the report, indicating that the data were collected and documented according to present standards of Good Laboratory Practices (GLP), and accurately reflect the results of the study.

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

A. **Test Procedure:** The test procedures were in accordance with the SEP and Subdivision J guidelines for a Tier-II seed germination/seedling emergence study on non-target plants, except for the following deviations:

- A germination pretest was not conducted to determine the germination potential of seeds.

- All plants in each replicate were weighed together, then the total weight was divided by the total number of plants to obtain each replicate mean value. The plants should have been individually weighed so the variation among plants within each replicate could be accounted for in the statistical analysis of the data.

Furthermore, the following discrepancies were found in the report:

- Treatment application rates of 0, 0.003, 0.0.03, 0.3, and 1.0 lb ai/A HOE 039866 (equal to 0.009, 0.09, 0.9, and 3.0 ppm ai, respectively) were reported as being selected for the test in the material and method section of the report. However, the result section showed that the treatment levels of 0, 0.019, 0.0375, 0.075, 0.15, and 0.3 lb ai/A were used.

- Discrepancies were found between Table 6 (attached) and Table 5 (attached). According to Table 5, the NOEC value for onion based on radicle length was 0.0375 lb ai/A. However, Table 6 presents 0.019 lb ai/A as the NOEC value for onion. Statistical analysis performed by KBN's reviewer confirmed that 0.0375 lb ai/A was the NOEC for onion radicle length.

- Table A reported the EC25 and EC50 values for cucumber radicle length as 11.3 and 2710 lb ai/A, respectively, while both values were reported as "ND" (i.e., a probit analysis could not be conducted) in Tables 6.

- The result section described tomato as the most sensitive species to HOE 039866 when based on the EC50 value, while the diagram and Table 6 showed onion as the most sensitive species.

B. Statistical Analysis:

Seed Germination: The reviewer conducted statistical analyses on selected data for both germination and radicle length using the ANOVA with multiple comparison tests (Tukey's, Bonferroni's for unequal samples or Newman-Keuls for equal samples, and Dunnett's). All printouts are attached. The results obtained were similar to those performed by the author. In some cases, the author's results were more conservative and

therefore were used in this assessment.

The EC25 and EC50 values were calculated using a regression analysis (attached). The results were similar to those reported by the author.

Seedling Emergence: Statistical analyses were conducted on selected data by the reviewer (attached) using the ANOVA with multiple comparison tests (Tukey's, Bonferroni, and Dunnett's). The results were in general agreement with those presented by the author. Statistical analyses (ANOVA) on dry weight could not be performed due to the lack of individual plant dry weight data.

The EC25 and EC50 for selected species were calculated by the reviewer using a regression analysis (attached).

C. **Discussion/Results:**

Seed Germination: This study is scientifically sound and fulfills the guideline requirements for a Tier-II seed germination toxicity test using non-target plants. Information obtained from EEB indicates that the maximum application rate for this pesticide is between 0.75 and 1.5 lb ai/A. In this study, the highest application rate tested for soybean, cucumber, oat, and corn was 1.0 lb ai/A, while the value for lettuce, carrot, tomato, cabbage, ryegrass, and onion was 0.3 lb ai/A.

Percent Germination: When seeds were treated at the above corresponding rates, only percent seed germination of carrot, cabbage, and onion were significantly affected by HOE 039866. Seed germination of the remaining species showed no adverse effects at their respective highest test rates of 0.3 and 1.0 lb ai/A. The maximum application rate of 1.5 lb ai/A should probably have been tested for those species. Based on percent germination, the most sensitive species to HOE 039866 was carrot with an NOEC and EC25 of 0.0375 and 0.212 lb ai/A, respectively (Table 7, attached). EC25 values for carrot and onion were <0.4 lb ai/A, while their EC50 values were <1.5 lb ai/A. No dose-response relationship was observed in the other eight species.

Radicle Length: Table 6 (attached) compares NOEC, EC25, and EC50 values for radicle length estimated by the author and the reviewer. Based on radicle length,

the NOEC values ranged from 0.003 lb ai/A (tomato) to 1.0 lb ai/A (soybean, cucumber, oat, and corn. Radicle length of soybean, cucumber, and oat did not show any dose response to HOE 039866. EC25 values for the other seven species were <0.5 lb ai/A. EC50 values for lettuce, carrot, tomato, and onion were <0.5 lb ai/A. The most sensitive species appears to be tomato, with an NOEC and EC25 of 0.003 and 0.007 lb ai/A, respectively.

From the study results, radicle length was generally more sensitive to HOE 039866 than percent germination (Table A, attached). A Tier-III study is required.

Seedling Emergence: This study is scientifically sound and fulfills the guideline requirements for a Tier-II seedling emergence toxicity test using non-target plants.

Phytotoxicity Rating: Based on phytotoxicity rating, lettuce and oat were not affected by HOE 039866 concentrations up to the maximum application rate of 1.5 lb ai/A (Table 28, attached). The most sensitive species appears to be cucumber with an NOEC value of 0.094 lb ai/A.

Percentage of Emerged Seedling: Concentrations up to the maximum application rate of 1.5 lb ai/A did not have any effect on the percentage of emerged seedlings of all plant species, except onion (Table 29, attached). Ryegrass had EC25 and EC50 of greater than 1.5 lb ai/A. NOEC, EC25, and EC50 for onion, the most sensitive species for this parameter, were 0.375, 0.846, and 2.63 lb ai/A, respectively.

Plant Height: Table 30 (attached) presents NOEC, EC25, and EC50 values, based on plant height. NOEC values ranged from 0.188 lb ai/A to 0.75 lb ai/A (soybean, cucumber, and oat). Based on plant height NOEC, the most sensitive species was ryegrass with an NOEC of 0.188 lb ai/A, while onion was the most sensitive species, based on its lowest EC25 of 0.228 lb ai/A. EC25 values for all plant species were <1.5 lb ai/A. EC50 values for carrot, tomato, cabbage, ryegrass, corn, and onion were <1.5 lb ai/A, while those for soybean, lettuce, cucumber, and oat were >1.5 lb ai/A.

Plant Dry Weight: Table 31 (attached) presents NOEC, EC25, and EC50 values, based on plant dry weight. Onion dry weight was unaffected by HOE 039866 maximum

rate of 1.5 lb ai/A. However, its EC25 (1.12 lb ai/A) was lower than the NOEC. Lettuce, carrot, tomato, and cabbage had the lowest NOEC value (0.188 lb ai/A), based on dry weight, but only lettuce and cabbage had similar EC25 values (~ 0.16 lb ai/A) and appears to be the most sensitive species. Onion was the least sensitive species with an NOEC and EC25 of 1.5 and 1.12 lb ai/A, respectively.

Table B (attached) summarizes the lowest NOEC, EC25, and EC50 values for all test species. The results from this study indicate that a Tier-III study is required for all species tested.

D. **Adequacy of the Study:**

(1) **Classification:**

Seed Germination: Core.

Seedling Emergence: Core.

(2) **Rationale:** The study followed the approved protocol for a toxicity test on seed germination/seedling emergence of non-target plants.

(3) **Repairability:** N/A.

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

GLUFOSINATE 128850

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Seed Germination Study CARROT

Analysis of Variance File: hoeger5 Date: 05-21-1989

FILTER: None

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

% Germination

* Indicates statistics are collapsed over this factor

Factors: T	Trt (lb ai/A)	N	Mean	S.D.
*		18	81.6667	13.3945
1	Control	3	96.6667	5.7735
2	0.019	3	93.3333	11.5470
3	0.0375	3	83.3333	5.7735
4	0.075	3	80.0000	10.0000
5	0.15	3	66.6667	5.7735
6	0.3	3	70.0000	10.0000

Fmax for testing homogeneity of between subjects variances: 4.00
Number of variances= 6 df per variance= 2.

Analysis of Variance Dependent variable: GERM

Source	df	SS (H)	MSS	F	P
Between Subjects	17	3050.0000			
T (TRT)	5	2183.3335	436.6667	6.046	0.0050
Subj w Groups	12	866.6665	72.2222		

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	96.667	6	70.000
2	93.333		
3	83.333		
4	80.000		
5	66.667		

Comparison	Tukey-A*	Newman -Keuls*	Dunnett
1 > 2			
1 > 3			
1 > 4			
1 > 5	0.0100	0.0100	0.0100
1 > 6	0.0500	0.0500	0.0100
2 > 3			N.A.
2 > 4			N.A.
2 > 5	0.0500	0.0500	N.A.
2 > 6	0.0500	0.0500	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.

NOEC = 0.075 lb ai/A

The author's result < 0.035 lb ai/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).

Seed Germination Study SOYBEAN

Analysis of Variance File: hoeger1 Date: 05-18-1989

FILTER: None

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

* Indicates statistics are collapsed over this factor Radicle length

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		177	67.7062	30.5615
1	*	Control	30	71.1000	28.8640
2	*	0.019	30	69.4333	38.5305
3	*	0.0375	30	73.2333	30.5193
4	*	0.075	29	69.4483	29.5219
5	*	0.15	30	65.0000	27.0988
6	*	0.30	28	57.3929	27.0956
*	1		59	72.1186	28.3969
*	2		60	56.3333	31.6424
*	3		58	74.9828	28.5808
1	1		10	65.6000	22.3666
1	2		10	75.0000	35.1663
1	3		10	72.7000	29.9037
2	1		10	76.6000	34.7090
2	2		11	33.4545	17.4319
2	3		9	105.4444	18.5345
3	1		10	89.4000	17.2575
3	2		10	43.9000	25.6924
3	3		10	86.4000	24.5818
4	1		9	74.5556	36.9598
4	2		10	70.5000	30.9417
4	3		10	63.8000	21.8419
5	1		10	69.2000	23.4606
5	2		10	69.4000	33.6029
5	3		10	56.4000	23.7356
6	1		10	57.6000	27.8974
6	2		9	47.1111	24.7914
6	3		9	67.4444	27.4778

A total of 1 observations had missing data on a dependent variable or covariate or inappropriate factor level codes.

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Fmax for testing homogeneity of between subjects variances: 4.59

Number of variances= 18 df per variance= 9.

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Analysis of Variance Dependent variable: RL

Source	df	SS (H)	MSS	F	P
Between Subjects	176	164384.6720			
T (TRT)	5	4637.4385	927.4877	1.267	0.2782
R (REP)	2	12161.3223	6080.6611	8.309	0.0004
TR	10	31230.1816	3123.0181	4.268	0.0000
Subj w Groups	159	116355.7340	731.7971		

Soybean

rl

Analysis of Variance File: hoeger1 Date: 05-18-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	71.100	6	57.393
2	69.433		
3	73.233		
4	69.448		
5	65.000		

Comparison	Scheffe'	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.

NOEC = 0.3 lb ai/A for this data set

Same results as the authors.

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

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Post-hoc tests for factor R (REP)

Level	Mean
1	72.119
2	56.333
3	74.983

Comparison	Scheffe'	Bon-ferroni	Dunnett
1 > 2	0.0073	0.0053	0.0100
1 < 3			
2 < 3	0.0012	0.0008	N.A.

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

Seed Germination CABBAGE

Analysis of Variance File: hoeger2 Date: 05-18-1989

FILTER: None

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

Radicle length

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		164	59.8110	21.0575
1	*	0 (Control)	29	64.4483	21.8821
2	*	0.019	22	62.8636	19.2287
3	*	0.0375	29	64.4483	19.6716
4	*	0.075	30	64.7667	19.6884
5	*	0.15	29	54.1724	15.4690
6	*	0.3	25	46.9600	25.0740
*	1		53	59.8679	21.6342
*	2		56	59.3036	19.3390
*	3		55	60.2727	22.5022
1	1		10	61.5000	28.0486
1	2		10	64.8000	19.2516
1	3		9	67.3333	18.8016
2	1		7	64.2857	22.4107
2	2		7	58.2857	15.5961
2	3		8	65.6250	20.9417
3	1		9	69.6667	13.6931
3	2		10	65.7000	18.0065
3	3		10	58.5000	25.3914
4	1		10	70.4000	11.3647
4	2		10	61.5000	25.9882
4	3		10	62.4000	19.7777
5	1		9	55.1111	13.0331
5	2		10	57.7000	17.0558
5	3		10	49.8000	16.3286
6	1		8	35.1250	20.6497
6	2		9	46.2222	15.1144
6	3		8	59.6250	33.5258

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Fmax for testing homogeneity of between subjects variances: 8.70

Number of variances= 18 df per variance= 8.

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Analysis of Variance Dependent variable: RL

Source	df	SS (H)	MSS	F	P
Between Subjects	163	72277.1250			
T (TRT)	5	7239.7402	1447.9480	3.476	0.0053
R (REP)	2	16.5121	8.2561	0.020	0.9805
TR	10	4195.2617	419.5262	1.007	0.4372
Subj w Groups	146	60825.6090	416.6138		

Cabbage - RL

Analysis of Variance   File: hoeger2   Date: 05-18-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	64.448	6	46.960
2	62.864		
3	64.448		
4	64.767		
5	54.172		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 = 3			
1 < 4			
1 > 5			
1 > 6	0.0500	0.0309	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	0.0309	N.A.
4 > 5			N.A.
4 > 6	0.0500	0.0238	N.A.
5 > 6			N.A.

NOEC = 0.3 lb ai/A
Same result as the author's.

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	59.868
2	59.304
3	60.273

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).

Seed Germination RYEGRASS

Analysis of Variance File: hoeger3 Date: 05-21-1989

FILTER: None

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

Radicle length

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt. (lb ai/A)	N	Mean	S.D.
*	*		152	38.4539	14.5870
1	*	Control	27	44.5556	16.4184
2	*	0.019	25	39.5200	13.0707
3	*	0.0375	27	45.2222	15.6410
4	*	0.075	25	29.4800	10.7204
5	*	0.15	24	32.3333	13.5668
6	*	0.3	24	38.3333	10.3951
*	1		49	36.4694	13.8249
*	2		51	38.1176	12.4445
*	3		52	40.6538	17.0131
1	1		9	42.0000	12.2577
1	2		9	42.6667	18.0762
1	3		9	49.0000	19.1181
2	1		10	42.9000	13.6092
2	2		7	37.0000	10.9545
2	3		8	37.5000	14.7455
3	1		8	46.7500	14.6458
3	2		10	38.3000	13.9368
3	3		9	51.5556	16.7788
4	1		7	23.2857	6.5502
4	2		9	34.0000	13.8654
4	3		9	29.7778	7.9809
5	1		7	25.7143	8.0356
5	2		8	34.7500	6.2507
5	3		9	35.3333	19.8053
6	1		8	32.8750	8.4081
6	2		8	41.7500	6.6063
6	3		8	40.3750	13.7315

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Fmax for testing homogeneity of between subjects variances: 10.04

Number of variances= 18 df per variance= 7.

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Analysis of Variance Dependent variable: RL

Source	df	SS (H)	MSS	F	P
Between Subjects	151	32129.6719			
T (TRT)	5	5183.1973	1036.6394	5.699	0.0001 *
R (REP)	2	565.4824	282.7412	1.554	0.2136
TR	10	2006.1127	200.6113	1.103	0.3619
Subj w Groups	134	24374.8789	181.9021		

Ryegrass - RL

Analysis of Variance   File: hoeger3   Date: 05-21-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	44.556	6	38.333
2	39.520		
3	45.222		
4	29.480		
5	32.333		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 < 3			
1 > 4	0.0100	0.0016	0.0100 *
1 > 5	0.0500	0.0236	0.0100 *
1 > 6			
2 < 3			N.A.
2 > 4	0.1000		N.A.
2 > 5			N.A.
2 > 6			N.A.
3 > 4	0.0100	0.0008	N.A.
3 > 5	0.0500	0.0133	N.A.
3 > 6			N.A.
4 < 5			N.A.
4 < 6			N.A.
5 < 6			N.A.

Same results as the author's

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	36.469
2	38.118
3	40.654

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).

Seed Germination Study Onion

Analysis of Variance File: hoeemg6 Date: 06-04-1989

FILTER: None

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

Radicle Length

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		156	17.4615	6.7052
1	*	Control	30	21.4333	6.7858
2	*	0.019	28	21.8929	5.5333
3	*	0.0375	28	17.6071	5.2305
4	*	0.075 *	22	16.0455	6.7505
5	*	0.15 *	25	13.4000	4.8305
6	*	0.30 *	23	12.4783	4.7661
*	1		51	16.4510	7.4197
*	2		51	18.9608	6.6722
*	3		54	17.0000	5.8471
1	1		10	22.5000	6.3814
1	2		10	20.6000	7.8486
1	3		10	21.2000	6.6299
2	1		9	22.2222	4.1466
2	2		10	25.0000	6.3070
2	3		9	18.1111	3.6209
3	1		9	15.7778	7.1024
3	2		10	16.5000	3.6286
3	3		9	20.6667	3.3541
4	1		6	12.5000	5.9582
4	2		7	20.4286	4.3534
4	3		9	15.0000	7.4666
5	1		9	11.5556	6.1667
5	2		7	15.0000	4.7958
5	3		9	14.0000	2.8723
6	1		8	11.6250	5.3168
6	2		7	14.0000	5.6862
6	3		8	12.0000	3.4641

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Fmax for testing homogeneity of between subjects variances: 7.47

Number of variances= 18 df per variance= 7.

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Analysis of Variance Dependent variable: RL

Source	df	SS (H)	MSS	F	P
Between Subjects	155	6968.7676			
T (TRT)	5	2051.3516	410.2703	13.321	0.0000
R (REP)	2	130.6949	65.3475	2.122	0.1228
TR	10	536.4111	53.6411	1.742	0.0768
Subj w Groups	138	4250.3096	30.7993		

Onion - RL

Analysis of Variance   File: hoeemg6   Date: 06-04-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	21.433	6	12.478
2	21.893		
3	17.607		
4	16.045		
5	13.400		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 > 3			
1 > 4	0.0100	0.0111	0.0100
1 > 5	0.0100	0.0000	0.0100
1 > 6	0.0100	0.0000	0.0100
2 > 3	0.1000	0.0673	N.A.
2 > 4	0.0100	0.0049	N.A.
2 > 5	0.0100	0.0000	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4			N.A.
3 > 5	0.1000	0.0999	N.A.
3 > 6	0.0500	0.0197	N.A.
4 > 5			N.A.
4 > 6			N.A.
5 > 6			N.A.

} * Same results as the author's.

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	16.451
2	18.961
3	17.000

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2	0.1000	0.0717	0.0500
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).

Seed Germination Study

Onion Germination

REGRESSION EQUATION:
Y= 4.701242 + .6702629 X

COEFFICIENT OF CORRELATION= .7766358

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=GERMINATION (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.721	3.52	3.547719	-2.771902E-02
2	-1.426	3.52	3.745447	-.2254467
3	-1.125	4.39	3.947196	.4428041
4	-.824	4.05	4.148945	-9.894466E-02
5	-.523	4.26	4.350694	-9.069395E-02

EC50 = 2.79 lb ai/A
EC25 = 0.28 "

Carrot Germination

REGRESSION EQUATION:
Y= 5.127038 + .972627 X

COEFFICIENT OF CORRELATION= .9239914

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=GERMINATION (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.721	3.25	3.453147	-.2031469
2	-1.426	3.92	3.740072	.1799283
3	-1.125	4.08	4.032833	.0471673
4	-.824	4.5	4.325594	.1744065
5	-.523	4.42	4.618354	-.1983538

EC50 = 0.74 lb ai/A
EC25 = 0.15 "

Seed Germination Study
Lettuce Radicle Length

REGRESSION EQUATION:
Y= 5.701182 + 1.067078 X

COEFFICIENT OF CORRELATION= .9378121

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=RADICLE LENGTH (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.721	3.82	3.864741	-4.474115E-02
2	-1.426	4.08	4.179529	-9.952927E-02
3	-1.125	4.61	4.50072	.1092806
4	-.824	5.08	4.82191	.25809
5	-.523	4.92	5.1431	-.2231002

EC50 = 0.220 lb ai/A
EC25 = 0.052 lb ai/A

Tomato Radicle Length

REGRESSION EQUATION:
Y= 5.678608 + .9259721 X

COEFFICIENT OF CORRELATION= .8643775

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=RADICLE LENGTH (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.721	4.39	4.08501	.3049903
2	-1.426	3.96	4.358172	-.3981714
3	-1.125	4.61	4.636889	-2.688885E-02
4	-.824	4.95	4.915607	3.439331E-02
5	-.523	5.28	5.194324	8.567619E-02

EC50 = 0.185 lb ai/A
EC25 = 0.035 lb ai/A

Seed Germination Study
Carrot Radicle Length

REGRESSION EQUATION:
Y= 5.323816 + 2.382058 X

COEFFICIENT OF CORRELATION= .452399

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=RADICLE LENGTH (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.426	3.45	1.927001	1.522999
2	-1.125	0	2.644001	-2.644001
3	-.824	4.08	3.361	.7189999
4	-.523	4.48	4.077999	.4020009

$EC_{50} = 0.7312$

$EC_{25} = 0.3826$

Ryegrass Radicle Length

REGRESSION EQUATION:
Y= 5.232343 + 1.653624 X

COEFFICIENT OF CORRELATION= .4088168

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.721	3.77	2.386456	1.383544
2	-1.426	0	2.874275	-2.874275
3	-1.125	4.64	3.372016	1.267984
4	-.824	4.45	3.869756	.5802436
5	-.523	4.01	4.367497	-.3574972

$EC_{50} = 0.724$ lb ai/A

$EC_{25} = 0.285$ "

Seed Germination Study

Corn Radicle Length

REGRESSION EQUATION:
Y= 4.71218 + .5483 X

COEFFICIENT OF CORRELATION= .7552531

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=RADICLE LENGTH (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.721	3.96	3.768555	.1914446
2	-1.426	3.82	3.930304	-.1103041
3	-1.125	3.77	4.095342	-.3253422
4	-.824	4.48	4.26038	.2196198
5	-.523	4.45	4.425419	2.458096E-02

EC_{50} = 3.35 lb ai/A
EC_{25} = 0.20 "

Onion Radicle Length

REGRESSION EQUATION:
Y= 5.433635 + 1.029898 X

COEFFICIENT OF CORRELATION= .9808877

PRESS ENTER TO CONTINUE.?
ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=RADICLE LENGTH (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.426	3.92	3.965001	-4.500103E-02
2	-1.125	4.29	4.275	1.499987E-02
3	-.824	4.69	4.585	.1050005
4	-.523	4.82	4.894999	-7.499838E-02

EC_{50} = 0.38 lb ai/A
EC_{25} = 0.08 "

Seedling Emergence Study Carrot Phytotoxicity Rating

Analysis of Variance File: hoeemg Date: 05-24-1989

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		123	1.4472	1.6155
1	*	Control	22	0.2273	0.4289
2	*	0.094	21	0.0952	0.3008
3	*	0.188	16	0.5625	0.7274
4	*	0.375	22	1.2727	1.5486
5	*	0.750	22	3.0000	1.1547
6	*	1.500	20	3.4000	0.8208
*	1		41	1.2683	1.5496
*	2		41	1.1463	1.4241
*	3		41	1.9268	1.7803
1	1		7	0.4286	0.5345
1	2		9	0.2222	0.4410
1	3		6	0.0000	0.0000
2	1		7	0.0000	0.0000
2	2		8	0.1250	0.3536
2	3		6	0.1667	0.4082
3	1		5	0.2000	0.4472
3	2		5	0.8000	0.8367
3	3		6	0.6667	0.8165
4	1		9	1.2222	1.7159
4	2		7	0.5714	0.5345
4	3		6	2.1667	1.8348
5	1		6	2.3333	1.2111
5	2		7	2.4286	1.1339
5	3		9	3.8889	0.3333
6	1		7	3.2857	0.9512
6	2		5	3.8000	0.4472
6	3		8	3.2500	0.8864

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Fmax for testing homogeneity of between subjects variances: Not defined

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Analysis of Variance Dependent variable: PR

Source	df	SS (H)	MSS	F	P
Between Subjects	122	318.4065			
T (TRT)	5	213.6322	42.7264	54.925	0.0000
R (REP)	2	5.2339	2.6169	3.364	0.0381
TR	10	17.8607	1.7861	2.296	0.0175
Subj w Groups	105	81.6797	0.7779		

Carrot - PR

Analysis of Variance File: hoeemg Date: 05-24-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	0.227	6	3.400
2	0.095		
3	0.563		
4	1.273		
5	3.000		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 < 3			
1 < 4	0.0100	0.0024	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	0.0005	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.

* Same results as the author's.

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	1.268
2	1.146
3	1.927

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 < 3	0.0100	0.0031	0.0100
2 < 3	0.0100	0.0004	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).

Soybean ~~H~~eight

Analysis of Variance File: hoeemg4 Date: 05-24-1989

FILTER: None

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

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt (lbai/A)	N	Mean	S.D.
*	*		164	203.9817	53.6144
1	*	Control	28	217.2143	36.4655
2	*	0.094	26	219.5000	31.8701
3	*	0.188	28	213.6429	65.2716
4	*	0.375	27	229.2963	34.4035
5	*	0.750	26	194.6923	46.9364
6	*	1.500	29	152.7241	58.8138
*	1		58	191.0517	63.3089
*	2		54	201.8889	53.0631
*	3		52	220.5769	36.1377
1	1		10	219.8000	32.2277
1	2		9	210.0000	55.5630
1	3		9	221.5556	12.0012
2	1		10	211.1000	40.3525
2	2		8	205.2500	12.1155
2	3		8	244.2500	18.8206
3	1		9	177.6667	95.3834
3	2		10	233.7000	28.2255
3	3		9	227.3333	47.0611
4	1		10	227.1000	40.3828
4	2		8	215.0000	38.2137
4	3		9	244.4444	16.3027
5	1		9	197.2222	18.4444
5	2		9	201.7778	70.7403
5	3		8	183.8750	39.4151
6	1		10	112.7000	53.3834
6	2		10	149.7000	54.4325
6	3		9	200.5556	31.3014

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Fmax for testing homogeneity of between subjects variances: 63.17

Number of variances= 18 df per variance= 8.

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Analysis of Variance Dependent variable: HEIGHT

Source	df	SS (H)	MSS	F	P
Between Subjects	163	468544.9700			
T (TRT)	5	109516.3520	21903.2695	10.958	0.0000
R (REP)	2	24193.0332	12096.5166	6.052	0.0030
TR	10	42996.2110	4299.6211	2.151	0.0238
Subj w Groups	146	291839.3800	1998.8998		

Soybean height

Analysis of Variance File: hoeemg4 Date: 05-24-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	217.214	6	152.724
2	219.500		
3	213.643		
4	229.296		
5	194.692		

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			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	0.0828	N.A.
4 > 6	0.0100	0.0000	N.A.
5 > 6	0.0100	0.0103	N.A.

* same results as the author!

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	191.052
2	201.889
3	220.577

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 < 3	0.0100	0.0022	0.0100
2 < 3	0.1000	0.0992	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).

Seedling Emergence Study Carrot Height

Analysis of Variance   File: hoeemg5   Date: 05-24-1989

FILTER: None

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

28-day

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		123	39.1057	22.5370
1	*	Control	22	53.0000	10.1418
2	*	0.094	21	56.1905	9.4160
3	*	0.188	16	56.7500	13.7477
4	*	0.375	22	39.8636	22.0547
5	*	0.750	22	19.4545	14.8956
6	*	1.500	20	12.5500	11.1283
*	1		42	41.2143	22.4179
*	2		41	42.2683	20.4365
*	3		40	33.6500	24.2144
1	1		8	54.3750	12.8723
1	2		9	50.8889	8.1309
1	3		5	54.6000	10.0399
2	1		7	56.2857	5.2509
2	2		8	54.0000	12.4556
2	3		6	59.0000	9.3381
3	1		5	62.0000	13.8564
3	2		5	53.4000	16.9794
3	3		6	55.1667	11.8729
4	1		9	37.1111	23.7247
4	2		7	52.1429	7.4258
4	3		6	29.6667	26.9568
5	1		6	25.8333	16.4124
5	2		7	26.7143	16.9678
5	3		9	9.5556	3.3582
6	1		7	14.7143	13.1620
6	2		5	4.8000	4.8683
6	3		8	15.5000	10.7968

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Fmax for testing homogeneity of between subjects variances: 64.43

Number of variances= 18 df per variance= 6.

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Analysis of Variance   Dependent variable: HEIGHT

Source	df	SS (H)	MSS	F	P
Between Subjects	122	61965.6330			
T (TRT)	5	37970.3950	7594.0791	39.894	0.0000
R (REP)	2	474.5623	237.2811	1.247	0.2896
TR	10	3533.4531	353.3453	1.856	0.0593
Subj w Groups	105	19987.2266	190.3545		

Carrot - height

Analysis of Variance File: hoeemg5 Date: 05-24-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	53.000	6	12.550
2	56.190		
3	56.750		
4	39.864		
5	19.455		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 < 3			
1 > 4	0.0500	0.0313	0.0500
1 > 5	0.0100	0.0000	0.0100
1 > 6	0.0100	0.0000	0.0100
2 < 3			N.A.
2 > 4	0.0100	0.0029	N.A.
2 > 5	0.0100	0.0000	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4	0.0100	0.0050	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.

} * Same results as the author's.

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	41.214
2	42.268
3	33.650

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 > 3	0.0500	0.0440	0.0500
2 > 3	0.0500	0.0177	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).

Seedling Emergence Study Lettuce height

Analysis of Variance File: hoeemg3 Date: 05-24-1989

FILTER: None

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

* Indicates statistics are collapsed over this factor 21-day

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		167	25.8323	11.5579
1	*	Control	28	29.3214	12.6200
2	*	0.094	28	26.8214	14.9346
3	*	0.188	28	27.9286	11.9812
4	*	0.375	28	26.4286	9.0120
5	*	0.750	28	24.7143	8.8563
6	*	1.500	27	19.5556	8.9156
*	1		57	23.7895	12.7933
*	2		54	26.1667	10.5200
*	3		56	27.5893	11.0598
1	1		10	33.1000	12.9138
1	2		8	19.1250	9.5982
1	3		10	33.7000	10.4780
2	1		10	25.0000	17.5752
2	2		8	30.8750	15.4775
2	3		10	25.4000	12.3846
3	1		9	16.6667	8.8882
3	2		10	31.2000	11.8491
3	3		9	35.5556	5.1017
4	1		10	26.0000	10.3280
4	2		9	32.0000	2.4495
4	3		9	21.3333	9.1515
5	1		9	22.4444	10.6667
5	2		9	19.5556	6.9302
5	3		10	31.4000	3.1693
6	1		9	18.1111	9.2796
6	2		10	23.7000	5.3759
6	3		8	16.0000	10.8628

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Fmax for testing homogeneity of between subjects variances: 51.48

Number of variances= 18 df per variance= 8.

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Analysis of Variance Dependent variable: HEIGHT

Source	df	SS (H)	MSS	F	P
Between Subjects	166	22175.2949			
T (TRT)	5	1599.9957	319.9992	2.996	0.0131
R (REP)	2	413.2654	206.6327	1.935	0.1470
TR	10	4249.2388	424.9239	3.979	0.0001
Subj w Groups	149	15912.7949	106.7973		

Lettuce - 21-day height

Analysis of Variance   File: hoeemg3   Date: 05-24-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	29.321	6	19.556
2	26.821		
3	27.929		
4	26.429		
5	24.714		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4			
1 > 5			
1 > 6	0.0100	0.0093	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	0.0500	0.0471	N.A.
4 > 5			N.A.
4 > 6			N.A.
5 > 6			N.A.

Day-21 NOEC = 0.75 lb ai/

The author found no effects at any treatment level when compared to the 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	23.789
2	26.167
3	27.589

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).

Seedling Emergence Study

Lettuce

Analysis of Variance File: hoeemg7 Date: 06-05-1989

FILTER: None

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

Day-28

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		172	39.9419	12.4458
1	*	Control	28	44.2500	11.3092
2	*	0.094	28	47.0714	13.5481
3	*	0.188	29	42.0690	9.7319
4	*	0.375	28	44.0714	6.0793
5	*	0.750	29	34.8276	9.1420
6	*	1.500	30	28.3000	12.7473
*	1		59	40.1017	12.7708
*	2		55	38.7636	11.5325
*	3		58	40.8966	13.0555
1	1		10	42.0000	8.5245
1	2		8	39.5000	10.3923
1	3		10	50.3000	12.6759
2	1		10	50.8000	16.3218
2	2		8	43.0000	14.9857
2	3		10	46.6000	8.8969
3	1		10	38.1000	11.0800
3	2		10	44.0000	10.8934
3	3		9	44.3333	5.4544
4	1		10	43.9000	5.1088
4	2		9	46.3333	5.1478
4	3		9	42.0000	7.6322
5	1		9	38.3333	7.7621
5	2		10	27.8000	10.7992
5	3		10	38.7000	2.4518
6	1		10	27.3000	13.1407
6	2		10	33.7000	3.7727
6	3		10	23.9000	16.7826

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Fmax for testing homogeneity of between subjects variances: 46.86

Number of variances= 18 df per variance= 9.

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Analysis of Variance Dependent variable: HEIGHT

Source	df	SS (H)	MSS	F	P
Between Subjects	171	26487.4180			
T (TRT)	5	7376.1543	1475.2308	13.633	0.0000
R (REP)	2	88.1679	44.0839	0.407	0.6685
TR	10	2358.3967	235.8397	2.179	0.0216
Subj w Groups	154	16664.6992	108.2123		

Lettuce - height

Analysis of Variance File: hoeemg7 Date: 06-05-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	44.250	6	28.300
2	47.071		
3	42.069		
4	44.071		
5	34.828		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 < 2			
1 > 3			
1 > 4			
1 > 5	0.0500	0.0123	0.0100
1 > 6	0.0100	0.0000	0.0100
2 > 3			N.A.
2 > 4			N.A.
2 > 5	0.0100	0.0003	N.A.
2 > 6	0.0100	0.0000	N.A.
3 < 4			N.A.
3 > 5	0.1000		N.A.
3 > 6	0.0100	0.0000	N.A.
4 > 5	0.0500	0.0153	N.A.
4 > 6	0.0100	0.0000	N.A.
5 > 6			N.A.

Day 28 NOEC = 0.375

} * Same results as the author's.

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	40.102
2	38.764
3	40.897

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).

Seedling Emergence Study

Ryegrass

Analysis of Variance   File: hoeemg9   Date: 06-05-1989

FILTER: None

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

Day - 21

* Indicates statistics are collapsed over this factor

Factors: T	R	Trt (lb ai/A)	N	Mean	S.D.
*	*		153	117.4052	63.6795
1	*	Control	28	156.6786	27.7770
2	*	0.094	26	153.1923	48.2734
3	*	0.188	28	152.7143	32.3632
4	*	0.375	24	114.3333	58.4976
5	*	0.750	26	76.6538	63.0403
6	*	1.500	21	27.6190	15.9389
*	1		53	115.3585	62.8592
*	2		50	126.8000	61.6875
*	3		50	110.1800	66.5781
1	1		10	149.8000	23.2465
1	2		9	166.6667	17.6564
1	3		9	154.3333	38.8169
2	1		9	161.5556	28.5136
2	2		10	133.5000	53.3005
2	3		7	170.5714	57.1018
3	1		8	151.8750	37.0538
3	2		10	157.8000	41.1010
3	3		10	148.3000	23.0461
4	1		10	102.5000	69.1331
4	2		6	136.8333	59.4623
4	3		8	112.2500	43.9797
5	1		10	78.2000	60.5728
5	2		9	107.7778	62.5475
5	3		7	34.4286	47.9752
6	1		6	23.3333	9.3950
6	2		6	22.6667	13.6626
6	3		9	33.7778	19.7090

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Fmax for testing homogeneity of between subjects variances: 54.15

Number of variances= 18   df per variance= 7.

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Analysis of Variance   Dependent variable: HEIGHT

Source	df	SS (H)	MSS	F	P
Between Subjects	152	616372.8800			
T (TRT)	5	324090.8400	64818.1680	33.984	0.0000
R (REP)	2	3315.3179	1657.6589	0.869	0.4258
TR	10	31480.1797	3148.0181	1.651	0.0982
Subj w Groups	135	257486.5940	1907.3081		

Ryegrass - height

Analysis of Variance   File: hoeemg9   Date: 06-05-1989

FILTER: None

Post-hoc tests for factor T (TRT)

Level	Mean	Level	Mean
1	156.679	6	27.619
2	153.192		
3	152.714		
4	114.333		
5	76.654		

Comparison	Tukey-A*	Bon-ferroni	Dunnett
1 > 2			
1 > 3			
1 > 4	0.0100	0.0102	0.0100
1 > 5	0.0100	0.0000	0.0100
1 > 6	0.0100	0.0000	0.0100
2 > 3			N.A.
2 > 4	0.0500	0.0310	N.A.
2 > 5	0.0100	0.0000	N.A.
2 > 6	0.0100	0.0000	N.A.
3 > 4	0.0500	0.0295	N.A.
3 > 5	0.0100	0.0000	N.A.
3 > 6	0.0100	0.0000	N.A.
4 > 5	0.0500	0.0418	N.A.
4 > 6	0.0100	0.0000	N.A.
5 > 6	0.0100	0.0032	N.A.

NOEC = 0.188 lb ai/A

* Same results as the author's.

* 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).

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Post-hoc tests for factor R (REP)

Level	Mean
1	115.358
2	126.800
3	110.180

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).

Seedling Emergence Study

Kyegrass
% Seedling emerging

REGRESSION EQUATION:
Y= 3.976981 + .5406013 X

COEFFICIENT OF CORRELATION= .6546483

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	3.45	3.421783	2.821684E-02
2	-.426	3.92	3.746685	.1733155
3	-.125	3.45	3.909406	-.4594054
4	.176	4.33	4.072126	.2578735

EC25 = 1.50 lb ai/A
EC50 = 78.05 "

Onion
% Seedling emerging

REGRESSION EQUATION:
Y= 4.326163 + 1.39387 X

COEFFICIENT OF CORRELATION= .8284985

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-.726	3.52	3.314213	.2057867
2	-.426	3.25	3.732374	-.4823742
3	-.125	4.5	4.151929	.3480711
4	.176	4.5	4.571484	-7.148409E-02

EC25= 3.04 lb ai/A
EC50= 1.01 "

Seedling Emergence Study

Tomato height

REGRESSION EQUATION:
Y= 4.784172 + 1.716611 X

COEFFICIENT OF CORRELATION= .9909891

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	2.95	3.021212	-7.121205E-02
2	-.426	4.23	4.052896	.1771045
3	-.125	4.5	4.569596	-6.959581E-02
4	.176	5.05	5.086296	-3.629541E-02

EC25 = 0.54 lb ai/A
EC50 = 1.34 "

Cucumber height

REGRESSION EQUATION:
Y= 4.227872 + 1.117208 X

COEFFICIENT OF CORRELATION= .7351102

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	3.66	3.0805	.5795004
2	-.726	2.67	3.416779	-.746779
3	-.125	4.01	4.088221	-7.822084E-02
4	.176	4.67	4.424501	.2454996

EC25 = 1.23 lb ai/A
EC50 = 4.91 "

Seedling Emergence Study

Cabbage height

REGRESSION EQUATION:
Y= 5.285162 + 2.075099 X

COEFFICIENT OF CORRELATION= .9851655

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	3.36	3.154036	.2059643
2	-.726	3.52	3.77864	-.2586403
3	-.426	4.39	4.40117	-1.116991E-02
4	-.125	5	5.025775	-2.577448E-02
5	.176	5.74	5.650379	8.962059E-02

EC_{25} = 0.35 lb ai/A

EC_{50} = 0.73 "

Ryegrass height

REGRESSION EQUATION:
Y= 5.378872 + 2.49735 X

COEFFICIENT OF CORRELATION= .97363

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	3.12	2.814094	.3059061
2	-.726	3.12	3.565796	-.445796
3	-.426	4.39	4.315001	7.499886E-02
4	-.125	5.03	5.066703	-3.670311E-02
5	.176	5.92	5.818406	.1015944

EC_{25} = 0.38 lb ai/A

EC_{50} = 0.71 "

Seedling Emergence Study — Oat height

REGRESSION EQUATION:
Y= 4.381681 + 1.060431 X

COEFFICIENT OF CORRELATION= .926747

PRESS ENTER TO CONTINUE.?
ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	3.45	3.292619	.1573813
2	-.426	3.66	3.929938	-.2699375
3	-.125	4.16	4.249127	-8.912706E-02
4	.176	4.77	4.568317	.201683

EC25 = 0.89 lb ai/A

EC50 = 3.83 "

Corn height

REGRESSION EQUATION:
Y= 4.935404 + 2.108563 X

COEFFICIENT OF CORRELATION= .9812444

PRESS ENTER TO CONTINUE.?
ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	2.95	2.769911	.1800892
2	-.726	3.36	3.404588	-4.458809E-02
3	-.426	3.72	4.037157	-.3171566
4	-.125	4.72	4.671834	.0481658
5	.176	5.44	5.306511	.1334887

EC25 = 0.52 lb ai/A

EC50 = 1.07 "

Seedling Emergence Study Onion height

REGRESSION EQUATION:
Y= 5.93093 + 2.520981 X

COEFFICIENT OF CORRELATION= .9779275

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	3.36	3.341882	1.811767E-02
2	-.726	4.26	4.100698	.1593027
3	-.426	4.45	4.856992	-.406992
4	-.125	5.88	5.615807	.2641931
5	.176	6.34	6.374622	-3.462219E-02

EC_{25} = 0.23 lb a.i./A
EC_{50} = 0.43 "

Lettuce Weight

REGRESSION EQUATION:
Y= 5.270541 + 1.157286 X

COEFFICIENT OF CORRELATION= .9984967

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMATED Y	ERROR
1	-1.027	4.05	4.082008	-3.200817E-02
2	-.726	4.45	4.430352	1.964808E-02
3	-.426	4.8	4.777537	2.246284E-02
4	-.125	5.15	5.12588	2.411985E-02
5	.176	5.44	5.474224	-3.422356E-02

EC_{25} = 0.15 lb ai/A
EC_{50} = 0.58 lb ai/A

Seedling Emerg

Y = 4.3698 + 1.

. Concentration, Y =

EC25 = 0.94

EC50 = 2.81

Y = 5.3982 + 2

g concentration, Y

EC25 = 0.33

EC50 = 0.66

Y = 4.0501 + 1

Log concentration, Y

EC25 = 1.39,

EC50 = 3.09

Y = 4.2509 + 9

Log concentration,

EC25 = 1.24

EC50 = 7.63

Y = 5.1779 +

Log concentration,

EC25 = 0.38

EC50 = 0.82

Seedling Emergence Study

REGRESSION EQUATION:
Y= 4.962228 + 1.386814 X

COEFFICIENT OF CORRELATION= .9421631

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMA
1	-1.027	3.82	3.537
2	-.726	3.72	3.955
3	-.426	4.12	4.371
4	-.125	4.87	4.788
5	.176	5.33	5.206

EC25 = 0.35 lb

EC50 = 1.06

Y= 5.792977 + 1.849101 X

COEFFICIENT OF CORRELATION= .942776

PRESS ENTER TO CONTINUE.?

ACTUAL VERSUS ESTIMATED VALUES
X=LOG CONCENTRATION Y=EFFECT (PROBITS)

DATA POINT	X	Y	ESTIMA
1	-1.027	4.16	3.893
2	-.726	4.26	4.450
3	-.426	4.95	5.005
4	-.125	5.18	5.561
5	.176	6.48	6.118

EC25 = 0.16 lb a

EC50 = 0.37 "

Seedling Emergence Study

Tomato Weight

$Y = 4.9783 + 1.0797X$ $r = 1.0$

X = Log Concentration, Y = effect (probits)

EC25 = 0.25

EC50 = 1.05

Corn Weight

$Y = 40.42 - 91.36X$ $r = 1.0$

X = Log Concentration, Y = % reduction

EC25 = 0.68

EC50 = 1.27

Onion Weight

$Y = 4.2040 + 1.4452X$ $r = 0.97$

X = Log Concentration, Y = effects (probits)

EC25 = 1.22

EC50 = 3.55

Oat Weight

$Y = 4.6066 + 4.0532X$

X = Log Concentration, Y = effects (probits)

EC25 = 0.85

EC50 = 1.25

Ryegrass Weight

$Y = 4.6331 + 1.5449X$ $r = 0.87$

X = Log Concentration, Y = effects (probits)

EC25 = 0.64

EC50 = 1.73