DATA EVALUATION RECORD
SEEDLING EMERGENCE EC_{25} TEST
§122-1 (TIER I) and 123-1 (TIER II)

1. CHEMICAL: Thidiazuron PC Code No.: 120301

2. TEST MATERIAL: Thidiazuron SC42 (Thidiazuron SC 500 g/L) Purity: 42.6%

3. CITATION:

Author: Teixeira, D.

Title: Thidiazuron SC42-Determination of Effects on Seedling Emergence and Seedling Growth of Ten Plant Species

Study Completion Date: April 8, 2003

Laboratory: Springborn Smithers Laboratories
790 Main Street
Wareham, Massachusetts 02571-1075

Sponsor: Bayer CropScience
2 T.W. Alexander Drive
Research Triangle Park, North Carolina 27709

Laboratory Report ID: 13798.6113

MRID No.: 45908501

DP Barcode: D289980

4. REVIEWED BY: Rebecca Bryan, Staff Scientist, Dynamac Corporation

Signature: Rebecca Bryan **Date:** 12/4/03

APPROVED BY: Teri Myers, Ph.D., Staff Scientist, Dynamac Corporation

Signature: T. S. Myers **Date:** 12/4/03

5. APPROVED BY:

Signature: **Date:**

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Signature: **Date:** 12/4/03

5. APPROVED BY: William Evans, Biologist, OPP/EFED/ERB1

Signature: William Evans **Date:** 12/2/04

6. STUDY PARAMETERS:

Scientific Name of Test Organism: Dicots: *Brassica oleracea, Cucumis sativus, Lactuca sativa, Glycine max, Lycopersicon esculentum, Brassica rapa*
Monocots: *Zea mays, Avena sativa, Allium cepa, Triticum aestivum*

Definitive Study Duration: 21 days

Type of Concentrations: Nominal

7. CONCLUSIONS:

Seedling emergence was studied on 10 plant species after application of Thidiazuron SC42 at varying concentrations; response in treatment groups was compared to a negative control. Test species included cabbage, corn, cucumber, lettuce, oat, onion, soybean, tomato, turnip, and wheat. Cabbage, corn, oat, onion, soybean, tomato, and wheat were tested at a single nominal concentration of 200 g a.i./ha (0.178 lb ai/A)(Tier I test). The Tier II test with lettuce and turnip was conducted at concentrations of 12.5, 25, 50, 100, and 200 g a.i./ha (0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A) .

During the study, there was no sensitivity (defined by a reduction equal or greater to 25% from control) of emergence, shoot length, or dry weight for cabbage, corn, cucumber, soybean, tomato, and wheat. There were significant effects (≥25%) on the emergence of lettuce, oat, and onion, and the shoot lengths and dry weights of lettuce and turnip. Onion was the most sensitive monocot with 33% reduction in emergence; this species was not tested under Tier II conditions, so NOEC, EC_{05}, and EC_{25} values could not be determined. The most sensitive dicot and endpoint was lettuce dry weight with NOEC, EC_{05}, and EC_{25} values of <12.5, 4.7, and 17 g a.i./ha (0.1111, 0.0042, and 0.0152 lb ai/A), respectively.

This study is classified as SUPPLEMENTAL. This study is scientifically sound, but it does not fulfill the guideline requirements for a seedling emergence study (Subdivision J, §122-1 (TIER I) and 123-1 (TIER II)) because both oat and onion emergence showed sensitivity (>25% reduction from control) to treatment, yet a Tier II study was not conducted with these monocot species so NOEC EC_{05}, and EC_{25} values could not be determined for these species and endpoints.

Most sensitive monocot: Onion
Most sensitive parameter: Emergence (33% reduction)
NOEC: <200 g a.i./ha (<0.178 lb ai/A)
EC_{05}: <200 g a.i./ha (<0.178 lb ai/A) 95% C.I.: Could not determine (Tier I)
EC_{25}: <200 g a.i./ha (<0.178 lb ai/A) 95% C.I.: Could not determine (Tier I)

Slope: Could not determine (Tier I)

Most sensitive dicot: Lettuce
Most sensitive parameter: Shoot dry weight
NOEC: <12.5 g a.i./ha (0.011 lb ai/A)
EC_{05}: 4.7 g a.i./ha (0.004 lb ai/A) 95% C.I.: 1.5-15 g a.i./ha (0.0013 - 0.013 lb ai/A)
EC_{25}: 17 g a.i./ha (0.015 lb ai/A) 95% C.I.: 8.4-36 g a.i./ha (0.007 - 0.032 lb ai/A)
Slope: 1.71±0.292

8. ADEQUACY OF THE STUDY:

A. Classification: Supplemental

B. Rationale: This study is scientifically sound but it does not fulfill the guideline requirements for a seedling emergence study (Subdivision J, §122-1 (TIER I) and 123-1 (TIER II)) because both oat and onion emergence showed sensitivity (>25% reduction from control) to treatment, yet a Tier II study was not conducted with these monocot species so NOEC EC_{05}, and EC_{25} values could not be determined for these species and endpoints.

C. Repairability: A Tier II study should be conducted with oat and onion to determine the NOEC EC_{05}, and EC_{25} values for these species and their most sensitive endpoint (emergence).

9. GUIDELINE DEVIATIONS:

The NOEC, EC_{05}, and EC_{25} values could not be determined for oat and onion emergence, as reductions greater than 25% were exhibited at the only treatment level tested (200 g a.i./ha (0.178 lb ai/A)).

10. SUBMISSION PURPOSE: This study was submitted to provide data on the phytotoxic effects of pre-emergent application of Thidiazuron SC42 to non-target crop species for the purpose of chemical reregistration.

11. MATERIALS AND METHODS:

A. Test Organisms

Guideline Criteria	Reported Information
Species: 6 dicots in 4 families, including soybean and a rootcrop; 4 monocots in 2 families, including corn.	Dicots: cabbage, cucumber, lettuce, soybean, tomato and turnip Monocots: corn, oat, onion, and wheat
Number of plants per repetition:	Oat, onion, and wheat: 5 seeds per replicate, 8 replicates per treatment (40 seeds per treatment) Cabbage, corn, cucumber, lettuce, soybean, tomato and turnip: 4 seeds per replicate, 10 replicates per treatment (40 seeds per treatment)
Source of seed and historical % germination of seed:	See Table 1, p. 33 for seed source information and seed % germination (85-99%).

B. Test System

Guideline Criteria	Reported Information
Solvent:	N/A
Site of test:	The tests were performed in a laboratory greenhouse.
Planting method/type of pot:	Polypropylene pots (13 cm tall with 13 cm top diameter and 9 cm bottom diameter). Filter paper (20- cm) placed in pot interior base. Seeds were planted at a depth of approximately 1 cm in circular pattern in each pot. The support medium was a loamy-sand soil (85% sand, 12% silt, 3% clay, 1.1% organic carbon, and 1.9% organic matter).
Method of application:	The application chamber had an overhead atomizing spray nozzle with a revolving belt that transported the pots past the spray nozzle.

Guideline Criteria	Reported Information
Method of watering:	Sub-irrigation with nutrient solution twice weekly and well water for additional watering (p. 18).
Growth stage at application:	Seeds (pre-emergent).

C. Test Design

Guideline Criteria	Reported Information
Dose range: 2x or 3x	N/A (only one dose for cabbage, corn, cucumber, oat, onion, soybean, tomato, and wheat) Lettuce and turnip: 2x
Doses: At least 5	200 g a.i./ha (0.178 lb ai/A)(for cabbage, corn, cucumber, oat, onion, soybean, tomato, and wheat) Lettuce and turnip: 12.5, 25, 50, 100, and 200 g a.i./ha (0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A)
Controls: Negative and solvent	Negative control (deionized water)
Replicates per dose: At least 3	Oat, onion, and wheat: 8 replicates per treatment Cabbage, corn, cucumber, lettuce, soybean, tomato, and turnip:10 replicates per treatment
Test duration: 14 days	21 days
Were observations made at least weekly?	Yes

Guideline Criteria	Reported Information
Maximum dosage rate:	The test substance application volume was 500 L/ha, equivalent to the application of 18.58 mL/spray tray. The maximum treatment rate tested in this study was 200 g a.i./ha (0.178 lb ai/A).

12. REPORTED RESULTS:

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
Was a NOEC observed for each species?	No, a NOEC was not observed for oat and onion emergence and lettuce dry weight. An EC_{05} could not be determined for oat and onion emergence because these species were only tested under Tier I conditions.
Phytotoxic observations:	The morphological abnormalities (including necrosis and chlorosis) were determined on a scale of 0 for a normal plant to 100 for a total plant effect.
Were initial chemical concentrations measured? (Optional)	Yes.
Were adequate raw data included?	Replicate data were provided.

Results for the most sensitive parameter of each species

Results Synopsis

Crop	Emergence*		Shoot length*		Dry weight*		Most sensitive parameter
	NOEC	EC_{25}	NOEC	EC_{25}	NOEC	EC_{25}	
Cabbage	0.178	>0.178	0.178	>0.178	0.178	>0.178	None
Corn	0.178	>0.178	0.178	>0.178	0.178	>0.178	None

Crop	Emergence*		Shoot length*		Dry weight*		Most sensitive parameter
	NOEC	EC_{25}	NOEC	EC_{25}	NOEC	EC_{25}	
Cucumber	0.178	>0.178	0.178	>0.178	0.178	>0.178	None
Lettuce	0.0223	0.0303	0.0223	0.082	<0.0111	0.01787	Dry weight
Oat	<0.178	<0.178	0.178	>0.178	0.178	>0.178	Emergence
Onion	<0.178	<0.178	0.178	>0.178	0.178	>0.178	Emergence
Soybean	0.178	>0.178	0.178	>0.178	0.178	>0.178	None
Tomato	0.178	>0.178	0.178	>0.178	0.178	>0.178	None
Turnip	0.178	>0.178	0.002	0.037	0.0446	0.0534	Shoot length
Wheat	0.178	>0.178	0.178	>0.178	0.178	>0.178	None

* Units are lb ai/A.

Morphological Observations

Cabbage: By 21 days, mean emergence rates were 88% in the control and 90% in the 200 g a.i./ha (0.178 lb ai/A) treatment group. Mean shoot lengths were 3.3 and 3.1 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively, which corresponds to 5.4% inhibition. Mean shoot dry weights were 0.1362 and 0.1817 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. By 21 days, there were no mortalities or morphological abnormalities.

Corn: By 21 days, mean emergence rates were 100% in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group. Mean shoot lengths were 42.7 and 48.0 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. Mean shoot dry weights were 0.4696 and 0.5673 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. By 21 days, there were no mortalities or morphological abnormalities.

Cucumber: By 21 days, mean emergence rates were 93% in the control and 100% in the 200 g a.i./ha (0.178 lb ai/A) treatment group. Mean shoot lengths were 7.2 and 6.1 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively, which corresponds to 16% inhibition. Mean shoot dry weights were 0.3933 and 0.4316 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. By 21 days, there were no mortalities observed in the control or treatment group. The morphological abnormalities of necrosis and chlorosis were observed in the 200 g a.i./ha (0.178 lb ai/A) treatment group with a mean plant effect of 4%, compared to 0% mean plant effect in the control.

Lettuce: By 21 days, the emergence inhibitions were 6, 20, 34, 54, and 66%, in the 0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A treatment groups, respectively, compared to the control. The percent emergence was significantly different in the 0.0446, 0.0891 and 0.178 lb ai/A treatment groups compared to the control. The shoot length inhibitions were 8, 7, 13, 27, and 54%, in the 0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A treatment groups, respectively, compared to the control. The shoot lengths were significantly different in the 0.0446, 0.0891 and 0.178 lb ai/A treatment groups compared to the control. The shoot dry weight inhibitions were 25, 32, 53, 75, and 87% in the 0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A treatment groups, respectively, compared to the control. The dry weights were significantly different in all treatment groups compared to the control.

By 21 days, there were three mortalities observed in the 200 g a.i./ha (0.178 lb ai/A) treatment group. No other mortalities were observed during testing. The morphological abnormality of chlorosis were observed in the 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A treatment groups corresponding to mean plant effects of 10, 10, 10, and 37%, compared to 0% mean plant effect in the control and the 12.5 g a.i./ha (0.0111 lb ai/A) treatment group.

Oat: By 21 days, mean emergence rates were 95% in the control and 70% in the 200 g a.i./ha treatment group. The percent emergence in the 200 g a.i./ha (0.178 lb ai/A) treatment group was significantly different from the control. Mean shoot lengths were 35.2 and 36.9 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. Mean shoot dry weights were 0.2393 and 0.2870 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. By 21 days, there were no mortalities or morphological abnormalities.

Onion: By 21 days, mean emergence rates were 83% in the control and 55% in the 200 g a.i./ha treatment group. The percent emergence in the 200 g a.i./ha (0.178 lb ai/A) treatment group was significantly different from the control. Mean shoot lengths were 17.3 and 17.2 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. Mean shoot dry weights were 0.0309 and 0.0299 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively, which corresponds to 3% inhibition. By 21 days, the mean plant effects were 3 and 2% in the control (one mortality) and 200 g a.i./ha (0.178 lb ai/A) treatment group (necrosis), respectively.

Soybean: By 21 days, mean emergence rates were 98% in the control and 100% in the 200 g a.i./ha (0.178 lb ai/A) treatment group. Mean shoot lengths were 24.6 and 24.4 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively, which corresponds to 1% inhibition. Mean shoot dry weights were 1.3303 and 1.2674 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively, which corresponds

to 5% inhibition. By 21 days, there were no mortalities or morphological abnormalities.

Tomato: By 21 days, mean emergence rates were 95% in the control and 93% in the 200 g a.i./ha (0.178 lb ai/A) treatment group. Mean shoot lengths were 10.9 and 11.5 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. Mean shoot dry weights were 0.3037 and 0.3281 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively. By 21 days, there were no mortalities or morphological abnormalities.

Turnip: By 21 days, the emergence inhibitions were -15, -8, -12, -19, and -12%, in the 0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A treatment groups, respectively, compared to the control. The shoot length inhibitions were -11, -10, 31, 48, and 50%, in the 0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A treatment groups, respectively, compared to the control. The shoot lengths were significantly different in the 0.0446, 0.0891 and 0.178 lb ai/A treatment groups compared to the control. The shoot dry weight inhibitions were 18, 15, 24, 35, and 44% in the 0.0111, 0.0223, 0.0446, 0.0891 and 0.178 lb ai/A treatment groups, respectively, compared to the control. The dry weights were significantly different in the 0.0891 and 0.178 lb a.i./A treatment groups compared to the control.

By 21 days, there were no mortalities observed in the control or treatment groups. The morphological abnormality of chlorosis were observed in the 0.0446, 0.0891 and 0.178 lb ai/A treatment groups corresponding to mean plant effects of 10, 18, and 35%, compared to 0% mean plant effect in the control and the 0.0111 and 0.0223 lb ai/A treatment groups.

Wheat: By 21 days, mean emergence rates were 98% in the control and 100% in the 200 g a.i./ha (0.178 lb ai/A) treatment group. Mean shoot lengths were 24.4 and 23.9 cm in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively, which corresponds to 2% inhibition. Mean shoot dry weights were 0.2028 and 0.1962 g in the control and 200 g a.i./ha (0.178 lb ai/A) treatment group, respectively, which corresponds to 3% inhibition. By 21 days, there were no mortalities or morphological abnormalities.

Statistical Results

Statistical Method: The NOEC and EC_{25} values were estimated based on percent reduction data when <25% reduction occurred in the treatment group compared to the control. For data with >25% reductions, the replicate means were tested for normality using the Chi-square test and for homogeneity using the Bartlett's test. The Dunnett's Test, Bonferroni's t-Test, or Wilcoxon's Rank Sum Test (non-parametric method) was used to determine significant differences from the control data. The EC values and 95% confidence intervals were determined by linear regression of response (percent reduction

of parameter as compared to the control) versus the nominal concentration, and were calculated using the computer program Toxstat (Gulley et al. 1996).

Most sensitive monocot: Onion
Most sensitive parameter: Emergence (33% reduction)
EC_{25}: <200 g a.i./ha (0.178 lb ai/A)
NOEC: <200 g a.i./ha (0.178 lb ai/A)

Most sensitive dicot: Lettuce
Most sensitive parameter: Shoot dry weight
EC_{25}: 21 g a.i./ha (0.01187 lb ai/A)
NOEC: <12.5 g a.i./ha (<0.0111 lb ai/A)

13. REVIEWER'S VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: Emergence, shoot length, and dry weight data were statistically analyzed for all species which exhibited a reduction from control. For the Tier I tests, the NOEC was determined by comparing the treatment group to the control group using a Student's t-test; the EC_{05} and EC_{25} values were visually estimated. For the Tier II tests, the data were analyzed to determine if they satisfied the assumptions of ANOVA (i.e., normal distribution and variance homogeneity). For data which did not satisfy these assumptions, transformations were attempted and if unsuccessful, the non-parametric Wilcoxon Rank Sum test, followed by Bonferroni's t-test, was used to determine the NOEC. When data satisfied the assumptions of ANOVA, the NOEC was determined using either Dunnett's or William's tests. These analyses were conducted using TOXSTAT statistical software. The EC_{05} and EC_{25} values (including 95% confidence intervals and slopes) were determined using the Probit method via Nuthatch statistical software.

Results synopsis

Crop	Emergence*			Shoot length*			Dry weight*			Most sensitive parameter
	NOEL	EC_{05}	EC_{25}	NOEL	EC_{05}	EC_{25}	NOEL	EC_{05}	EC_{25}	
Cabbage	0.178	>0.178	>0.178	0.178	<0.178	>0.178	0.178	>0.178	>0.1708	None
Corn	0.178	>0.178	>0.178	0.178	>0.178	>0.178	0.178	>0.178	>0.178	None
Cucumber	0.178	>0.178	>0.178	<0.178	<0.178[a]	>0.178	0.178	>0.178	>0.178	None
Lettuce	0.0111[a]	0.0039	0.0259[a]	0.0229	0.0339	0.0874[b]	<0.0111	0.0042	0.0152[a]	Dry weight
Oat	<200	<200	<200	0.178	>0.178	>0.178	0.178	>0.178	>0.178	Emergence
Onion	<200	<200	<200	0.178	>0.178	>0.178	0.178	>0.178	>0.178	Emergence
Soybean	0.178	>0.178	>0.178	0.178	>0.178	>0.178	0.178	0.178	>0.178	None
Tomato	0.178	>0.178	>0.178	0.178	>0.178	>0.178	0.178	>0.178	>0.178	None
Turnip	0.178	>0.178	>0.178	0.0223	0.0089	0.041[a]	0.0223[a]	0.0031	0.0446[a]	Shoot length
Wheat	0.178	>0.178	>0.178	0.178	>0.178	>0.178	0.178	>0.178	>0.178	None

*All NOEC and EC_{25} values are reported in lb ai/A.
[a] The value determined by the reviewer was lower than the value reported by the study authors.
[b] The value determined by the reviewer was higher than the value reported by the study authors.

EC_x values, confidence intervals, and slopes

Species	Emergence *					Shoot length*				
	EC_{05}	Confidence interval	EC_{25}	Confidence interval	Slope	EC_{05}	Confidence interval	EC_{25}	Confidence interval	Slope
Cabbage	>0.178	N/A	>0.178	N/A	N/A	<0.178	N/A	>0.178	N/A	N/A
Corn	>0.178	N/A	>0.178	N/A	N/A	>0.178	N/A	>0.178	N/A	N/A
Cucumber	>0.178	N/A	>0.178	N/A	N/A	<0.178[a]	N/A	>0.178	N/A	N/A
Lettuce	0.0039	0.0007-0.0241	0.0259[a]	0.0098-0.0669	1.20	0.0339	0.0143-0.0802	0.0874[b]	0.0588-0.1337	2.35
Oat	<0.178	N/A	<0.178	N/A	N/A	>0.178	N/A	>0.178	N/A	N/A
Onion	<0.078	N/A	<0.178	N/A	N/A	>0.178	N/A	>0.178	N/A	N/A
Soybean	>0.178	N/A	>0.178	N/A	N/A	>0.178	N/A	>0.178	N/A	N/A
Tomato	>0.178	N/A	>0.178	N/A	N/A	>0.178	N/A	>0.178	N/A	N/A
Turnip	>0.178	N/A	>0.178	N/A	N/A	0.0089	0.0035-0.0232	0.041[a]	0.025-0.0669	1.47
Wheat	>0.178	N/A	>0.178	N/A	N/A	>0.178	N/A	>0.178	N/A	N/A

[1]*All NOEC and EC_{25} values are reported in lb ai/A.
[aa] The value determined by the reviewer was lower than the value reported by the study authors.
[bb] The value determined by the reviewer was higher than the value reported by the study authors.
N/A=not applicable

EC_x values, confidence intervals, and slopes (cont.)

Species	Dry weight*				
	EC_{05}	Confidence interval	EC_{25}	Confidence interval	Slope
Cabbage	>0.178	N/A	>0.178	N/A	N/A
Corn	>0.178	N/A	>0.178	N/A	N/A
Cucumber	>0.178	N/A	>0.178	N/A	N/A
Lettuce	0.0042	0.0013-0.0134	0.0152[a]	0.0075-0.0321	1.71
Oat	>0.178	N/A	>0.178	N/A	N/A
Onion	>0.178	N/A	>0.178	N/A	N/A
Soybean	0.178	N/A	>0.178	N/A	N/A
Tomato	>0.178	N/A	>0.178	N/A	N/A
Turnip	0.0031	0.0005-0.061	0.0446[a]	0.0125-0.1604	0.842
Wheat	>0.178	N/A	>0.178	N/A	N/A

*All NOEC and EC_{25} values are reported in lb ai/A.
[a] The value determined by the reviewer was lower than the value reported by the study authors.
[b] The value determined by the reviewer was higher than the value reported by the study authors.
N/A=not applicable

Most sensitive monocot: Onion
Most sensitive parameter: Emergence (33% reduction)
NOEC: <200 g a.i./ha (<0.178 lb ai/A)
EC_{05}: <200 g a.i./ha (<0.178 lb ai/A) 95% C.I.: Could not determine (Tier I)
EC_{25}: <200 g a.i./ha (<0.178 lb ai/A) 95% C.I.: Could not determine (Tier I)
Slope: Could not determine (Tier I)

Most sensitive dicot: Lettuce
Most sensitive parameter: Shoot dry weight
NOEC: <12.5 g a.i./ha (0.0111 lb ai/A)
EC_{05}: 4.7 g a.i./ha (0.0042 lb ai/A) 95% C.I.: 1.5-15 (0.0013-0.0134)
EC_{25}: 17 g a.i./ha (0.0152 lb ai/A) 95% C.I.: 8.4-36 (0.0075-0.0321)
Slope: 1.71±0.292

14. REVIEWER'S COMMENTS:

The reviewer's conclusions regarding the most sensitive dicot were identical to the study author's; lettuce was the most sensitive dicot, based on dry weight. Some of the reviewer's NOEC and EC values differed from the study author's due to the different methods used to estimate these values. Because the reviewer's estimates were associated with slopes for determining EC values, they were chosen to be reported in the Conclusions section. Furthermore, both the reviewer's and the study author's analysis detected significant reductions in oat and onion emergence, yet the study author failed to conduct Tier II studies with these species; this deficiency affected the acceptability of this study.

This study was conducted in accordance with OECD and U.S. EPA Good Laboratory Practice Standards (40 CFR, Part 160) with the exception of the routine soil and water screening analyses which were conducted at GeoLabs, Inc., Braintree, Massachusetts. The study included a Quality Assurance statement.

The tests were conducted during the following dates: the test with cabbage, corn, cucumber, oat, soybean, and wheat (February 6-March 6, 2003), the test with onion, tomato, and turnip (February 6-March 10, 2003), and the test with lettuce (February 14-March 14, 2003).

The stock solutions were cloudy and white in color (pp 18-19).

The TOC of the deionized water was 0.91-1.2 mg/L (measured in February and March, 2003).

Environmental conditions during testing were reported in Table 2, p. 34. In the greenhouse during all tests, the temperature range was 16-33°C, the relative humidity range was 19-71%, and the light intensity was 6700-40,000 lux. While these environmental conditions are variable, they did not differ greatly across species, and did

not appear to differentially impact control and treatment groups.

15. REFERENCES:

Daniel, W.W. 1990. Applied Nonparametric Statistics, 2 ed. PWS-KENT Publishing Company: Boston Massachusetts. 635 pp.

Dunnett, C.W. 1955. A multiple comparison procedure for comparing several treatments with a control. *J. Amer. Stat. Assoc.* 50: 1096-1121.

Dunnett, C.W. 1964. New tables for multiple comparisons with a control. *Biometrics* 20: 482-491.

Gulley, D.D., A.M. Boelter, and H.L. Bergman. 1996 Toxstat Release 3.5. University of Wyoming, Laramie, Wyoming.

Horning, W.B. and C.I. Weber. 1985. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Second Edition. Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio. EPA/600/4-85-014.

OECD. 1997. Good Laboratory Practice in the Testing of Chemicals. Paris, France.

OECD. 2000. OECD Guidelines for the Testing of Chemicals. Proposal for Revision of Guideline 208.

Sokal, R.R. and F.J. Rohlf. 1981. *Biometry.* 2nd Ed. W.H. Freeman and Co. New York, New York.

U.S. EPA. 1982. Pesticide Assessment Guidelines, Subdivision J, Hazard Evaluation: Nontarget Plants. PB83-153940. U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA. 1986. Hazard Evaluation Division. Standard Evaluation Procedure. Non-Target Plants: Seed Germination/Seedling Emergence/ Vegetative Vigor. EPA 540/9-86-132. U.S. EPA Washington, D.C.

U.S. EPA. 1994. Pesticide Reregistration Rejection Rate Analysis: Ecological Effects. EPA 738-R-94-035, U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA. 1989. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Good Laboratory Practice Standards; Final Rule (40 CFR, Part 160). Federal Register, 48 (230); 34052-34074.

U.S. EPA. 1996. Office of Prevention, Pesticides and Toxic Substances. Ecological Effects Test

Guideline, OPPTS 850.4100. Terrestrial Plant Toxicity, Tier I (Seedling Emergence). "Public Draft" EPA 712-C-96-153. April 1996. U.S. Environmental Protection Agency. Washington, D.C.

U.S. EPA. 1996. Office of Prevention, Pesticides and Toxic Substances. Ecological Effects Test Guideline, OPPTS 850.4250. Seedling Emergence, Tier II. "Public Draft" EPA 712-C-96-363. April 1996. U.S. Environmental Protection Agency. Washington, D.C.

Weber, C.I. *et al.* 1989. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. 2nd ed. EPA/600/4/89/001. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH.

Zar, J.H. 1984. Biostatistical Analysis. 2 ed. Prentice-Hall, Inc.: Englewood Cliffs, NJ, 718 pp.

APPENDIX I. OUTPUT FROM REVIEWER'S STATISTICAL VERIFICATION:

Cabbage length

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	3.29	3.12
Variance	0.332111	0.021778
Observations	10	10
Pooled Variance	0.176944	
Hypothesized Mean Difference	0	
df	18	
t Stat	0.903682	
P(T<=t) one-tail	0.18905	
t Critical one-tail	1.734063	
P(T<=t) two-tail	0.3781	
t Critical two-tail	2.100924	

Cucumber length

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	7.2	6.09
Variance	0.308889	0.245444
Observations	10	10
Pooled Variance	0.277167	
Hypothesized Mean Difference	0	
df	18	
t Stat	4.71452	
P(T<=t) one-tail	**8.64E-05**	
t Critical one-tail	1.734063	
P(T<=t) two-tail	0.000173	
t Critical two-tail	2.100924	

Lettuce Emergence

File: 8501le Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	21081.897	4216.379	10.728
Within (Error)	52	20437.500	393.029	
Total	57	41519.397		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

lettuce emergence
File: 8501le Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	87.500	87.500		
2	12.5	82.500	82.500	0.564	
3	25	70.000	70.000	1.974	
4	50	57.500	57.500	3.384	*
5	100	40.000	40.000	5.358	*
6	200	37.500	37.500	5.317	*

Bonferroni T table value = 2.40 (1 Tailed Value, P=0.05, df=50,5)

lettuce emergence
File: 8501le Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	10			
2	12.5	10	21.314	24.4	5.000
3	25	10	21.314	24.4	17.500
4	50	10	21.314	24.4	30.000
5	100	10	21.314	24.4	47.500
6	200	8	22.607	25.8	50.000

lettuce emergence
File: 8501le Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	87.500	87.500	87.500
2	12.5	10	82.500	82.500	82.500
3	25	10	70.000	70.000	70.000
4	50	10	57.500	57.500	57.500
5	100	10	40.000	40.000	40.000
6	200	8	37.500	37.500	37.500

lettuce emergence

File: 8501le Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	87.500				
12.5	**82.500**	**0.564**		**1.68**	**k= 1, v=52**
25	70.000	1.974	*	1.76	k= 2, v=52
50	57.500	3.384	*	1.79	k= 3, v=52
100	40.000	5.358	*	1.80	k= 4, v=52
200	37.500	5.317	*	1.80	k= 5, v=52

s = 19.825
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	95% Bounds Upper	Std.Err.	Lower Bound /Estimate
EC5	**4.4**	**0.74**	**27.**	**0.39**	**0.17**
EC10	8.9	2.0	39.	0.32	0.23
EC25	**29.**	**11.**	**75.**	**0.21**	**0.38**
EC50	1.1E+02	60.	1.8E+02	0.12	0.57

Slope = 1.20 Std.Err. = 0.293

Goodness of fit: p = 0.50 based on DF= 3.0 52.

8501LE : lettuce emergence

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	87.5	89.8	-2.28	100.	0.00
12.5	10.0	82.5	77.7	4.78	86.6	13.4
25.0	10.0	70.0	69.3	0.673	77.2	22.8
50.0	10.0	57.5	58.4	-0.873	65.0	35.0
100.	10.0	40.0	45.8	-5.80	51.0	49.0
200.	8.00	37.5	33.1	4.38	36.9	63.1

!!!Warning: EC5 not bracketed by doses evaluated.

!!!Warning: EC10 not bracketed by doses evaluated.

lettuce length
File: 8501ll Transform: NO TRANSFORMATION

WILCOXON RANK SUM TEST W/ BONFERRONI ADJUSTMENT - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG

1	control	8.650				
2	12.5	7.970	83.50	74.00	10	
3	**25**	**8.100**	**87.00**	**74.00**	**10**	
4	50	7.490	73.50	74.00	10	*
5	100	6.290	55.50	74.00	10	*
6	200	3.950	41.50	49.00	8	*

Critical values use k = 5, are 1 tailed, and alpha = 0.05

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	95% Bounds Upper	Std.Err.	Lower Bound /Estimate
EC5	**38.**	**16.**	**90.**	**0.19**	**0.42**
EC10	54.	27.	1.1E+02	0.15	0.51
EC25	**98.**	**66.**	**1.5E+02**	**0.086**	**0.67**
EC50	1.9E+02	1.5E+02	2.5E+02	0.056	0.77

Slope = 2.35 Std.Err. = 0.642

Goodness of fit: p = 0.86 based on DF= 3.0 52.

8501LL : lettuce length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	8.65	8.30	0.354	100.	0.00
12.5	10.0	7.97	8.27	-0.303	99.7	0.274
25.0	10.0	8.10	8.14	-0.0367	98.1	1.92
50.0	10.0	7.49	7.58	-0.0911	91.4	8.62
100.	10.0	6.29	6.18	0.110	74.5	25.5
200.	8.00	3.95	3.99	-0.0412	48.1	51.9

lettuce weight
File: 8501lw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	23309986.814	4661997.363	27.013
Within (Error)	53	9146965.356	172584.252	
Total	58	32456952.169		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

lettuce weight
File: 85011w Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	2115.000	2115.000		
2	12.5	1588.800	1588.800	2.832	*
3	25	1442.100	1442.100	3.622	*
4	50	983.900	983.900	6.088	*
5	100	521.600	521.600	8.576	*
6	200	267.222	267.222	9.680	*

Bonferroni T table value = 2.40 (1 Tailed Value, P=0.05, df=50,5)

lettuce weight
File: 85011w Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	10			
2	12.5	10	446.632	21.1	526.200
3	25	10	446.632	21.1	672.900
4	50	10	446.632	21.1	1131.100
5	100	10	446.632	21.1	1593.400
6	200	9	458.871	21.7	1847.778

lettuce weight
File: 85011w Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	2115.000	2115.000	2115.000
2	12.5	10	1588.800	1588.800	1588.800
3	25	10	1442.100	1442.100	1442.100
4	50	10	983.900	983.900	983.900
5	100	10	521.600	521.600	521.600
6	200	9	267.222	267.222	267.222

lettuce weight
File: 8501lw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	2115.000				
12.5	1588.800	2.832	*	1.68	k= 1, v=53
25	1442.100	3.622	*	1.76	k= 2, v=53
50	983.900	6.088	*	1.79	k= 3, v=53
100	521.600	8.576	*	1.80	k= 4, v=53
200	267.222	9.680	*	1.80	k= 5, v=53

s = 415.433
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	95% Bounds Upper	Std.Err.	Lower Bound /Estimate
EC5	**4.7**	**1.5**	**15.**	**0.25**	**0.32**
EC10	7.7	2.9	20.	0.21	0.38
EC25	**17.**	**8.4**	**36.**	**0.16**	**0.48**
EC50	43.	27.	69.	0.10	0.62

Slope = 1.71 Std.Err. = 0.292

Goodness of fit: p = 0.86 based on DF= 3.0 53.

8501LW : lettuce weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	2.12e+03	2.08e+03	36.0	100.	0.00
12.5	10.0	1.59e+03	1.71e+03	-118.	82.1	17.9
25.0	10.0	1.44e+03	1.37e+03	76.2	65.7	34.3
50.0	10.0	984.	948.	35.4	45.6	54.4
100.	10.0	522.	553.	-31.8	26.6	73.4
200.	9.00	267.	265.	2.31	12.7	87.3

!!!Warning: EC5 not bracketed by doses evaluated.

!!!Warning: EC10 not bracketed by doses evaluated

Oat emergence
t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	95	70
Variance	85.71429	114.2857
Observations	8	8
Pooled Variance	100	
Hypothesized Mean Difference	0	
df	14	
t Stat	5	
P(T<=t) one-tail	**9.73E-05**	
t Critical one-tail	1.761309	
P(T<=t) two-tail	0.000195	
t Critical two-tail	2.144789	

Onion emergence

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	82.5	55
Variance	50	200
Observations	8	8
Pooled Variance	125	
Hypothesized Mean Difference	0	
df	14	
t Stat	4.91935	
P(T<=t) one-tail	**0.000113**	
t Critical one-tail	1.761309	
P(T<=t) two-tail	0.000226	
t Critical two-tail	2.144789	

Onion weight

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	0.030938	0.029875
Variance	6.89E-05	2.84E-05
Observations	8	8
Pooled Variance	4.86E-05	
Hypothesized Mean Difference	0	
df	14	
t Stat	0.304672	
P(T<=t) one-tail	0.382549	
t Critical one-tail	1.761309	
P(T<=t) two-tail	0.765098	
t Critical two-tail	2.144789	

Soybean length

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	24.65	24.38
Variance	5.233889	3.086222

Observations	10	10
Pooled Variance	4.160056	
Hypothesized Mean Difference	0	
df	18	
t Stat	0.296005	
P(T<=t) one-tail	0.385307	
t Critical one-tail	1.734063	
P(T<=t) two-tail	0.770614	
t Critical two-tail	2.100924	

Soybean weight

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	1.33026	1.26745
Variance	0.015281	0.008453
Observations	10	10
Pooled Variance	0.011867	
Hypothesized Mean Difference	0	
df	18	
t Stat	1.289285	
P(T<=t) one-tail	0.106811	
t Critical one-tail	1.734063	
P(T<=t) two-tail	0.213621	
t Critical two-tail	2.100924	

turnip length

File: 8501tl Transform: SQUARE ROOT(Y)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	8.135	1.627	70.739
Within (Error)	54	1.256	0.023	
Total	59	9.391		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

turnip length
File: 8501tl Transform: SQUARE ROOT(Y)

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG

1	control	2.498	6.290		
2	12.5	2.645	7.000	-2.170	
3	**25**	**2.627**	**6.930**	**-1.912**	
4	50	2.073	4.320	6.261	*
5	100	1.804	3.260	10.230	*
6	200	1.776	3.170	10.637	*

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

turnip length
File: 8501tl Transform: SQUARE ROOT(Y)

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	10			
2	12.5	10	0.758	12.1	-0.710
3	25	10	0.758	12.1	-0.640
4	50	10	0.758	12.1	1.970
5	100	10	0.758	12.1	3.030
6	200	10	0.758	12.1	3.120

turnip length
File: 8501tl Transform: SQUARE ROOT(Y)

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	6.290	2.498	2.590
2	12.5	10	7.000	2.645	2.590
3	25	10	6.930	2.627	2.590
4	50	10	4.320	2.073	2.073
5	100	10	3.260	1.804	1.804
6	200	10	3.170	1.776	1.776

turnip length
File: 8501tl Transform: SQUARE ROOT(Y)

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	2.590				

12.5	2.590	1.353		1.68	k= 1, v=54
25	2.590	1.353		1.76	k= 2, v=54
50	2.073	6.225	*	1.79	k= 3, v=54
100	1.804	10.171	*	1.80	k= 4, v=54
200	1.776	10.575	*	1.80	k= 5, v=54

s = 0.153
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	95% Bounds Upper	Std.Err.	Lower Bound /Estimate
EC5	**10.**	**3.9**	**26.**	**0.20**	**0.39**
EC10	18.	8.2	38.	0.17	0.46
EC25	**46.**	**28.**	**75.**	**0.11**	**0.61**
EC50	1.3E+02	1.0E+02	1.7E+02	0.059	0.76

Slope = 1.47 Std.Err. = 0.235

!!!Poor fit: p < 0.001 based on DF= 3.00 54.0

8501TL : turnip length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	6.29	6.91	-0.622	100.	0.00
12.5	10.0	7.00	6.45	0.547	93.4	6.63
25.0	10.0	6.93	5.91	1.02	85.6	14.4
50.0	10.0	4.32	5.05	-0.735	73.1	26.9
100.	10.0	3.26	3.93	-0.672	56.9	43.1
200.	10.0	3.17	2.72	0.450	39.4	60.6

!!!Warning: EC5 not bracketed by doses evaluated.

turnip weight
File: 8501tw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	17612973.350	3522594.670	4.510
Within (Error)	54	42181107.500	781131.620	
Total	59	59794080.850		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

turnip weight
File: 8501tw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	3793.700	3793.700		
2	12.5	3127.600	3127.600	1.685	
3	25	3229.900	3229.900	1.426	
4	50	2890.200	2890.200	2.286	
5	100	2465.200	2465.200	3.361	*
6	200	2112.100	2112.100	4.254	*

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

turnip weight
File: 8501tw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	10			
2	12.5	10	913.038	24.1	666.100
3	25	10	913.038	24.1	563.800
4	50	10	913.038	24.1	903.500
5	100	10	913.038	24.1	1328.500
6	200	10	913.038	24.1	1681.600

turnip weight
File: 8501tw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	3793.700	3793.700	3793.700
2	12.5	10	3127.600	3127.600	3178.750
3	25	10	3229.900	3229.900	3178.750
4	50	10	2890.200	2890.200	2890.200
5	100	10	2465.200	2465.200	2465.200
6	200	10	2112.100	2112.100	2112.100

turnip weight
File: 8501tw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	3793.700				
12.5	3178.750	1.556		1.68	k= 1, v=54
25	**3178.750**	**1.556**		**1.76**	**k= 2, v=54**
50	2890.200	2.286	*	1.79	k= 3, v=54
100	2465.200	3.361	*	1.80	k= 4, v=54
200	2112.100	4.254	*	1.80	k= 5, v=54

s = 883.817
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	95% Bounds Upper	Std.Err.	Lower Bound /Estimate
EC5	**3.5**	**0.18**	**68.**	**0.64**	**0.052**
EC10	9.5	0.97	93.	0.50	0.10
EC25	**50.**	**14.**	**1.8E+02**	**0.28**	**0.28**
EC50	3.2E+02	1.1E+02	8.7E+02	0.22	0.36

Slope = 0.842 Std.Err. = 0.304

Goodness of fit: p = 0.86 based on DF= 3.0 54.

8501TW : turnip weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	3.79e+03	3.76e+03	32.6	100.	0.00
12.5	10.0	3.13e+03	3.31e+03	-187.	88.1	11.9
25.0	10.0	3.23e+03	3.10e+03	133.	82.3	17.7
50.0	10.0	2.89e+03	2.82e+03	69.2	75.0	25.0
100.	10.0	2.47e+03	2.49e+03	-29.1	66.3	33.7
200.	10.0	2.11e+03	2.13e+03	-18.9	56.7	43.3

!!!Warning: EC5 not bracketed by doses evaluated.

!!!Warning: EC10 not bracketed by doses evaluated.

!!!Warning: EC50 not bracketed by doses evaluated.

Wheat length

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	24.3625	23.85
Variance	6.048393	2.054286
Observations	8	8
Pooled Variance	4.051339	
Hypothesized Mean Difference	0	
df	14	
t Stat	0.509242	
P(T<=t) one-tail	0.309257	
t Critical one-tail	1.761309	
P(T<=t) two-tail	0.618514	
t Critical two-tail	2.144789	

Wheat weight

t-Test: Two-Sample Assuming Equal Variances

	Control	*200*
Mean	0.202838	0.196188
Variance	0.002141	0.00038
Observations	8	8
Pooled Variance	0.001261	
Hypothesized Mean Difference	0	
df	14	
t Stat	0.374549	
P(T<=t) one-tail	0.356804	
t Critical one-tail	1.761309	
P(T<=t) two-tail	0.713608	
t Critical two-tail	2.144789	