US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD
VEGETATIVE VIGOR EC_{25} TEST
§123-1(b) (TIER II)

3/24/04

1. **CHEMICAL:** Mesosulfuron-methyl — PC Code No.: 122009

2. **TEST MATERIAL:** AE F130060 (a.i.) + AE F107892 (adjuvant) — Purity: 74.73% + 3.54%

3. **CITATION:**

Author: M. T. Christ and J. Abedi

Title: Effect on Vegetative Vigor of Non-Target Terrestrial Plants (Tier II), AE F130060 + AE F107892, Water Dispersible Granule (75.3% w/w), Including a Representative Adjuvant

Study Completion Date: August 15, 2002

Laboratory: Aventis CropScience, Ecotoxicology Department
2 T.W. Alexander Dr.
Research Triangle Park, NC 27709, USA

Sponsor: Aventis CropScience, Ecotoxicology Department
2 T.W. Alexander Dr.
Research Triangle Park, NC 27709, USA

Laboratory Report ID: CK99W504

MRID No.: 45745701

DP Barcode: D295614

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

Signature: **Date:** 11/7/03

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

Signature: **Date:** 11/7/03

5. **APPROVED BY:** Michael Davy, OPP/EFED/ERBII

Signature: Michael Davy **Date:** 3/24/04

2013018

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Signature: **Date:** 11/7/03

5. **APPROVED BY:** Leo Lasota, OPP/EFED/ERBIII

Signature: **Date:**

6. STUDY PARAMETERS:

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

Definitive Study Duration: 14 days

Type of Concentrations: Nominal

7. CONCLUSIONS:

Vegetative vigor was studied on 10 plant species after application of AE F130060 + AE F107892 75.3% (a.i. Mesosulfuron-methyl,74.73%) at 0.06 ,0.19, 0.56, 1.67, 5, and 15 g a.i./ha. Test species included cabbage, corn, cucumber, lettuce, oat, onion, radish, soybean, tomato, and wheat. With the exception of wheat shoot length, all species and endpoints showed sensitivity to treatment, exhibiting reductions exceeding 25%. Tomato, a dicot, was the most sensitive species (based on dry weight), with an EC_{25} of 0.18 g a.i./ha; the EC_{05} and NOEC were 0.041 and 0.56 g a.i./ha. Corn was the most sensitive monocot (based on dry weight), with EC_{25} of 0.47; the EC_{05} and NOEC were 0.15 and 0.56 g a.i./ha.

This study is classified as Supplemental. This study is scientifically sound but does not fulfill the guideline requirements for vegetative vigor studies (Subdivision J, §123-1 (TIER II)).

Most sensitive monocot: Corn
Most sensitive parameter: Dry weight
NOEC: 0.56 g a.i./ha
EC_{05}: 0.15 g a.i./ha 95% C.I.: 0.059-0.39 g a.i./ha
EC_{25}: 0.47 g a.i./ha 95% C.I.: 0.27-0.84 g a.i./ha
Slope: 1.96±0.337

Most sensitive dicot: Tomato
Most sensitive parameter: Dry weight
NOEC: 0.56 g a.i./ha
EC_{05}: 0.0041 g a.i./ha 95% C.I.: 0.013-0.13 g a.i./ha
EC_{25}: 0.18 g a.i./ha 95% C.I.: 0.082-0.39 g a.i./ha
Slope: 1.52±0.229

8. ADEQUACY OF THE STUDY:

A. Classification: Supplemental

B. Rationale: This study is scientifically sound and but does not fulfill the guideline requirements for vegetative vigor studies (Subdivision J, §123-1 (TIER II)). Please see guideline deviations for explanation.

C. Repairability: None

9. GUIDELINE DEVIATIONS:

1. The herbicide being tested has an ALS inhibitor mode of action in which morphological symptoms of herbicide injury usually is seen in sensitive plants about 2 weeks after exposure to the herbicide. This delayed symptom is sometimes called the "slow death" syndrome. This study was conducted for 2 weeks. The EFED has recommended that studies that uses an ALS inhibitor herbicide br conducted for at least 3 weeks. Because this study was not conducted for sufficient amount of time, the EC25 values in this study are considered **to be under reported for phytotoxic sensitivity.**

2. The formulation tested in this study is not the formulation that will used in the U.S. The EFED has stated that for terrestrial plant studies, the study must use a formulation that has the highest percentage active ingredient

10. SUBMISSION PURPOSE: This study was submitted to provide data on the phytotoxicity to non-target crop species of AE F130060 + AE F107892 (a.i. mesosulfuron-methyl) after post-emergent application for the purpose of chemical registration.

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, radish, soybean, and tomato Monocots: corn, oat, onion, and wheat
Number of plants per repetition:	3 plants per replicate pot (10 replicates per control and treatment group)
Source of seed and historical % germination of seed:	See Table 1, p. 28 for seed source information and historical % germination of seed (85-100%).

B. Test System

Guideline Criteria	Reported Information
Solvent:	N/A (adjuvant contained Synperonic™ and the safener AE F107892 at a concentration of 24 g/L)
Site of test:	Greenhouse #2 Tests were performed at Aventis CropScience Research Center, Ecotoxicology Laboratory, Research Triangle Park, NC.
Planting method/type of pot:	Plastic pots with 6 inch diameter. Corn, cucumber, ryegrass, soybean, and wheat were planted at 2.5 cm depth. Cabbage, lettuce, onion, radish, and tomato were planted at 1.3 cm depth. The sandy loam soil used for planting was a mixture of natural topsoil and sand (pH 5.7 and 1.1% organic matter). The soil was fertilized periodically throughout the study.
Method of application:	Track sprayer enclosed in a fume hood.

Guideline Criteria	Reported Information
Method of watering:	The pots were subirrigated an average of twice a day. The water used was tap water.
Growth stage at application:	Seedlings (1-5 leaf stage, p. 15)

C. Test Design

Guideline Criteria	Reported Information
Dose range: 2x or 3x	3x
Doses: At least 5	0.06 ,0.19, 0.56, 1.67, 5, and 15 g a.i./ha
Controls: Negative and solvent	Negative control (deionized water)
Replicates per dose: At least 3	3 replicates
Test duration: 21 days due to ALS inhibitor herbicide	14 days
Were observations made at least weekly?	Yes
Maximum dosage rate:	The highest treatment was equivalent to a field application rate of 15 g a.i./ha. The application rate for the spray solution was 93.5 L/ha

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?	Yes
Phytotoxic observations:	See p. 21 and Table 6, p. 33 for phytotoxicity rating system.
Were initial chemical concentrations measured? (Optional)	Yes, the spray trial concentrations were measured (101-106% of nominal).

Guideline Criteria	Reported Information
Were adequate raw data included?	Replicate data were provided.

Results for the most sensitive parameter of each species

Results Synopsis

Vegetative Vigor

Crop	Day 21 Survival*		Shoot length*		Dry weight*		Most sensitive parameter
	NOEC	EC_{25}	NOEC	EC_{25}	NOEC	EC_{25}	
Cabbage	15	ND	0.56	1.77	0.56	0.42	Dry weight
Corn	1.67	ND	0.56	1.08	0.56	0.62	Dry weight
Cucumber	5	ND	0.19	1.76	0.19	0.67	Dry weight
Lettuce	15	ND	0.19	0.41	0.19	0.22	Dry weight
Oat	5	ND	0.56	1.32	0.56	0.80	Dry weight
Onion	5	ND	1.67	3.39	1.67	2.11	Dry weight
Radish	1.67	ND	0.19	0.51	0.19	0.36	Dry weight
Soybean	15	ND	0.19	0.79	0.19	0.24	Dry weight
Tomato	1.67	ND	0.19	0.47	0.19	0.31	Dry weight
Wheat	15	ND	5	>15	5	9.2	Dry weight

ND = Not determined
* Units are g a.i./ha

Morphological Observations (negative percent reductions indicate promoted growth)

Cabbage: Seedling survival was 100% for all treatment groups by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were -4, 0, -1, 26, 42, and 47% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were -14, -9, 6, 65, 75, and 84% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in

the 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the phytotoxic effects including chlorosis, leaf cupping, and height inhibition were significant in the 1.67, 5, and 15 g a.i./ha treatment groups.

Corn: Seedling survival was 100, 100, 100, 100, 40, and 7% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were 2, 15, 9, 54, 81, and 92% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were 1, 22, 22, 67, 91, and 92% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included leaf cupping in the 1.67 g a.i./ha treatment group, height inhibition in the 1.67, 5, and 15 g a.i./ha treatment groups, and necrosis in the 5 and 15 g a.i./ha treatment groups.

Cucumber: Seedling survival was 100, 100, 100, 100, 97, and 63% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were 5, 2, 14, 27, 36, and 35% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were 18, 3, 24, 47, 60, and 62% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included chlorosis in the 1.67 g a.i./ha treatment group, leaf cupping and height inhibition in the 1.67, 5, and 15 g a.i./ha treatment groups, and necrosis in the 15 g a.i./ha treatment groups.

Lettuce: Seedling survival was 100% for all treatment groups by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were 5, 1, 17, 52, 67, and 68% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were 12, 6, 35, 70, 80, and 86% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in

the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included chlorosis and height inhibition in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, and necrosis in the 1.67, 5, and 15 g a.i./ha treatment groups.

Oat: Seedling survival was 100, 100, 100, 100, 87, and 50% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were 6, -2, 1, 37, 61, and 69% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were 3, -9, -1, 59, 82, and 88% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included chlorosis and leaf twisting in the 1.67 g a.i./ha treatment group, height inhibition in the 1.67, 5, and 15 g a.i./ha treatment groups, and necrosis in the 5 and 15 g a.i./ha treatment groups.

Onion: Seedling survival was 100, 100, 100, 100, 93, and 63% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were 0, 7, 3, 10, 39, and 47% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were 1, 5, -7, 15, 54, and 69% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 5 and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included leaf malformation and height inhibition in the 5 and 15 g a.i./ha treatment groups, and necrosis in the 15 g a.i./ha treatment group.

Radish: Seedling survival was 100, 100, 87, 97, 33, and 3% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were -5, -10, 30, 48, 60, and 75% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were -5, -6,

44, 57, 57, and 75% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included chlorosis and leaf malformation in the 0.56 and 1.67 g a.i./ha treatment groups, and height inhibition and necrosis in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups.

Soybean: Seedling survival was 100% for all treatment groups by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were -1, 0, 19, 39, 43, and 45% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were 1, 1, 27, 65, 77, and 74% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included chlorosis, leaf malformation, height inhibition, and necrosis in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups.

Tomato: Seedling survival was 100, 100, 100, 100, 43, and 7% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were 8, 3, 34, 61, 77, and 78% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were 13, 5, 55, 86, 92, and 90% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups.

By 14 days, the significant phytotoxic effects included chlorosis and leaf curling in the 0.56 and 1.67 g a.i./ha treatment groups, height inhibition in the 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, and necrosis in the 1.67, 5, and 15 g a.i./ha treatment groups.

Wheat: Seedling survival was 100% for all treatment groups by 14 days; control survival was 100%.

By 14 days, the percent reductions of mean plant heights were -12, -6, -5, 0, 6, and 19% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The percent reductions of mean dry weights were -11, -23, -34, -12,

-3, and 33% in the 0.06, 0.19, 0.56, 1.67, 5, and 15 g a.i./ha treatment groups, respectively, compared to the control group. The height and dry weight inhibitions were significant in the 15 g a.i./ha treatment group.

By 14 days, the significant phytotoxic effects included leaf curling and height inhibition in the 15 g a.i./ha treatment group.

Statistical Results

Statistical Method: The percent inhibition was calculated using the equation on p. 22. The survival data was analyzed using the Fisher's Exact Test. The Shapiro-Wilk's test was used to determine normal distribution and the Bartlett's Test to determine homogeneity of variance for all data. The treatment group data was compared to the control using the Dunnett's one way analysis of variance. If transformations were not successful, the data were analyzed using Steele's Rank Sum Test. The EC_{25} and EC_{50} were calculated using non-linear regression based on Bruce and Versteeg or a linear interpolation program. The SAS® Procedure NLIN (Version 6.12) computer software was used to perform statistical analyses. The linear interpolation analyses were performed using Inhibition Concentration Approach (ICp)(Version 2.0).

Most sensitive monocot: Corn
Most sensitive parameter: Dry weight
NOEC: 0.56 g a.i./ha
EC_{25}: 0.62 g a.i./ha 95% C.I.: 0.35-0.90 g a.i./ha
EC_{50}: 1.17 g a.i./ha 95% C.I.: 0.86-1.61 g a.i./ha
Slope: Not reported

Most sensitive dicot: Lettuce
Most sensitive parameter: Dry weight
NOEC: 0.19 g a.i./ha
EC_{25}: 0.22 g a.i./ha 95% C.I.: 0.09-0.55 g a.i./ha
EC_{50}: 0.92 g a.i./ha 95% C.I.: 0.50-1.70 g a.i./ha
Slope: Not reported

13. REVIEWER'S VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: Shoot length and dry weight data were analyzed to determine if they satisfied the assumptions of ANOVA (i.e., normal distribution and homogeneity of variances). If they did, the NOEC was determined using ANOVA, followed by Bonferroni's t-test (unequal replicates, non-monotonic response), Dunnett's test (equal replicates, non-monotonic response), or William's test (monotonic response). If the data

did not meet these assumptions, transformations (e.g., square-root, inverse square-root, or natural log) were attempted. If these transformations were successful, the NOEC was determined using a method described above. If the transformations were not successful, the NOEC was determined using the non-parametric Kruskal-Wallis test. These analyses were conducted using TOXSTAT statistical software. The EC_{05} and EC_{25} values and their 95% confidence intervals and slopes were determined using the Probit method via Nuthatch statistical software.

Morphological Symptoms NOAEC - 14 DAT (Results in gm ai/ha)

Cabbage - 0.06,

Corn - ND since lowest dose has height inhibition

Cucumber - 0.19

Lettuce - 0.19

Oat - 1.67

Onion - 0.06

Radish - ND since at lowest dose has necrosis chlorosis and leaf malformation

Soybean - 0.19

Tomato - 0.06

Wheat - 5.0

Results synopsis

Crop	Shoot length*			Dry weight*			Most sensitive parameter
	NOEC	EC_{05}	EC_{25}	NOEC	EC_{05}	EC_{25}	
Cabbage	0.56	0.12	1.8	0.56	0.072	0.42	Dry weight
Corn	0.06[a]	0.27	0.82[a]	0.56	0.15	0.47[a]	Dry weight
Cucumber	0.19	0.028	1.9[b]	0.19	0.025	0.46[a]	Dry weight
Lettuce	0.19	0.033	0.41	0.19	0.028	0.22	Dry weight
Oat	0.56	0.16	1.0[a]	0.56	0.16	0.63[a]	Dry weight
Onion	1.67	0.40	3.4	1.67	0.50	2.1	Dry weight
Radish	0.19	0.074	0.51	0.19	0.028	0.29[a]	Dry weight
Soybean	0.19	0.019	0.79	0.19	0.021	0.24	Dry weight
Tomato	0.19	0.044	0.31[a]	0.56[b]	0.041	0.18[a]	Dry weight
Wheat	5	1.9	>15	5	2.9	8.7[a]	Dry weight

[a]The reviewer's estimate was lower than the study authors'.
[b] The reviewer's estimate was higher than the study authors'.
*units are g a.i./ha

EC_x values, confidence intervals, and slopes

Species	Shoot length*					Dry weight*				
	EC_{05}	Confidence interval	EC_{25}	Confidence interval	Slope	EC_{05}	Confidence interval	EC_{25}	Confidence interval	Slope
Cabbage	0.12	0.038-0.40	1.8	1.0-3.1	0.840±0.104	0.072	0.029-0.17	0.42	0.24-0.74	1.26±0.123
Corn	0.27	0.15-0.47	0.82[a]	0.59-1.1	2.00±0.234	0.15	0.059-0.39	0.47[a]	0.27-0.84	1.96±0.337
Cucumber	0.028	0.0039-0.21	1.9[b]	0.83-4.4	0.531±0.0844	0.025	0.0029-0.22	0.46[a]	0.14-1.5	0.765±0.137
Lettuce	0.033	0.0094-0.12	0.41	0.20-0.87	0.883±0.0957	0.028	0.0067-0.11	0.22	0.087-0.55	1.08±0.139
Oat	0.16	0.078-0.35	1.0[a]	0.68-1.6	1.21±0.116	0.16	0.074-0.35	0.63[a]	0.39-1.0	1.63±0.182
Onion	0.40	0.10-1.6	3.4	1.9-6.2	1.05±0.208	0.50	0.10-2.5	2.1	0.86-5.2	1.56±0.422
Radish	0.074	0.023-0.24	0.51	0.27-0.97	1.16±0.177	0.028	0.0045-0.18	0.29[a]	0.10-0.81	0.962±0.187
Soybean	0.019	0.0043-0.082	0.79	0.38-1.6	0.598±0.0655	0.021	0.0059-0.077	0.24	0.11-0.53	0.928±0.0995
Tomato	0.044	0.019-0.10	0.31[a]	0.19-0.51	1.15±0.107	0.041	0.013-0.13	0.18[a]	0.082-0.39	1.52±0.229
Wheat	1.9	0.63-6.0	>15	N/A	1.05±0.29	2.9	0.74-11	8.7[a]	5.2-15	2.01±0.840

[a] The reviewer's estimate was lower than the study authors'.
[b] The reviewer's estimate was higher than the study authors'.
*units are g a.i./ha

Most sensitive monocot: Corn
Most sensitive parameter: Dry weight
NOEC: 0.56 g a.i./ha
EC_{05}: 0.15 g a.i./ha 95% C.I.: 0.059-0.39 g a.i./ha
EC_{25}: 0.47 g a.i./ha 95% C.I.: 0.27-0.84 g a.i./ha
Slope: 1.96±0.337

Most sensitive dicot: Tomato
Most sensitive parameter: Dry weight
NOEC: 0.56 g a.i./ha
EC_{05}: 0.041 g a.i./ha 95% C.I.: 0.013-0.13 g a.i./ha
EC_{25}: 0.18 g a.i./ha 95% C.I.: 0.082-0.39 g a.i./ha
Slope: 1.52±0.229

14. REVIEWER'S COMMENTS:

The herbicide being tested has an ALS inhibitor mode of action in which morphological symptoms of herbicide injury usually is seen in sensitive plants about

14

2 weeks after exposure to the herbicide. This delayed symptom is sometimes called the "slow death" syndrome. This study was conducted for 2 weeks. The EFED has recommended that studies that uses an ALS inhibitor herbicide br conducted for at least 3 weeks. Because this study was not conducted for sufficient amount of time, the EC25 values in this study are considered to be under reported for phytotoxic sensitivity.

The formulation tested in this study is not the formulation that will used in the U.S. The EFED has stated that for terrestrial plant studies, the study must use a formulation that has the highest percentage active ingredient

The reviewer's conclusions regarding the most sensitive species (tomato, a dicot) differed from the study authors' (lettuce); furthermore, the reviewer's EC_{25} estimate for corn (the most sensitive monocot) was slightly lower than the study authors' estimate. Differences between the reviewer's and the study authors' estimates can be attributed to the different statistical methods which were used to derive these estimates. Because the reviewer's analysis provided EC_{05} values and slopes for all estimates, the reviewer's values are reported in the Conclusions section.

The morphological symptoms NOAEC differ from those NOAEC found for cabbage, onion and tomato. Each of these species have the NOAEC of 0.06 gm ai/ha which is more sensitive than the NOAEC found for measured length and weights.

The definitive study for cabbage, corn, oat, radish, and wheat was conducted from March 26, 2002 to April 9, 2002. The definitive study for cucumber, lettuce, tomato, and soybean was conducted from March 28, 2002 to April 11, 2002. The temperature ranged from 21.2 to 26.5°C and the humidity ranged from 21.6 to 67.5%. The light intensity was 157.7 to 453.9 $\mu mol\ m^{-2}s^{-1}$.

The definitive study for onion was conducted from June 4, 2002 to June 18, 2002. The temperature ranged from 26.5 to 29.3°C and the humidity ranged from 36.8 to 60.8%. The light intensity was 182.9 to 462.8 $\mu mol\ m^{-2}s^{-1}$.

The oat dry weight means were incorrectly reported in Table 10, p. 66 (values reported on this page are the means for onion dry weight).

A non-GLP range finding test and other previous definitive trials were conducted to determine the treatment concentrations for the final definitive study. The previous trials were not reported due to low analytical recoveries and a change in the adjuvant/safener rate.

This study was conducted in accordance with USEPA Good Laboratory Practice

Standards with the exception of the collection of data for the water and soil contaminant and screening analyses (p. 3). The study included a Quality Assurance statement.

15. REFERENCES:

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APPENDIX I. OUTPUT FROM REVIEWER'S STATISTICAL VERIFICATION:

cabbage length
File: 5701bl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	921.288	153.548	62.090
Within (Error)	63	155.810	2.473	
Total	69	1077.098		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

cabbage length
File: 5701bl 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	17.620	17.620		
2	0.06	18.380	18.380	-1.081	
3	0.19	17.590	17.590	0.043	
4	0.56	17.780	17.780	-0.228	
5	1.67	12.960	12.960	6.626	*
6	5	10.210	10.210	10.536	*
7	15	9.300	9.300	11.830	*

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

cabbage length
File: 5701bl 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	0.06	10	1.653	9.4	-0.760
3	0.19	10	1.653	9.4	0.030
4	0.56	10	1.653	9.4	-0.160
5	1.67	10	1.653	9.4	4.660
6	5	10	1.653	9.4	7.410
7	15	10	1.653	9.4	8.320

cabbage length
File: 5701bl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	17.620	17.620	18.000
2	0.06	10	18.380	18.380	18.000
3	0.19	10	17.590	17.590	17.685
4	0.56	10	17.780	17.780	17.685
5	1.67	10	12.960	12.960	12.960
6	5	10	10.210	10.210	10.210
7	15	10	9.300	9.300	9.300

cabbage length
File: 5701bl 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	18.000				
0.06	18.000	0.540		1.67	k= 1, v=63
0.19	17.685	0.092		1.75	k= 2, v=63
0.56	**17.685**	**0.092**		**1.77**	**k= 3, v=63**
1.67	12.960	6.626	*	1.78	k= 4, v=63
5	10.210	10.536	*	1.79	k= 5, v=63
15	9.300	11.830	*	1.79	k= 6, v=63

s = 1.573
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.12**	**0.038**	**0.40**	**0.26**	**0.31**
EC10	0.34	0.13	0.86	0.20	0.39
EC25	**1.8**	**1.0**	**3.1**	**0.12**	**0.57**
EC50	11.	8.2	15.	0.069	0.73

Slope = 0.840 Std.Err. = 0.104

!!!Poor fit: p < 0.001 based on DF= 4.00 63.0

5701BL : cabbage length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	17.6	18.5	-0.925	100.	0.00
0.0600	10.0	18.4	18.0	0.356	97.2	2.81
0.190	10.0	17.6	17.3	0.310	93.2	6.82
0.560	10.0	17.8	16.0	1.77	86.3	13.7

1.67	10.0	13.0	14.0	-1.08	75.7	24.3
5.00	10.0	10.2	11.4	-1.23	61.7	38.3
15.0	10.0	9.30	8.51	0.794	45.9	54.1

cabbage dry weight
File: 5701bw Transform: SQUARE ROOT(Y)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	13.075	2.179	136.188
Within (Error)	63	0.982	0.016	
Total	69	14.057		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

cabbage dry weight
File: 5701bw 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	1.621	2.653		
2	0.06	1.738	3.031	-2.079	
3	0.19	1.694	2.887	-1.300	
4	0.56	1.575	2.493	0.799	
5	1.67	0.955	0.930	11.762	*
6	5	0.810	0.667	14.331	*
7	15	0.650	0.429	17.164	*

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

cabbage dry weight
File: 5701bw 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	0.06	10	0.413	15.6	-0.378
3	0.19	10	0.413	15.6	-0.234
4	0.56	10	0.413	15.6	0.160
5	1.67	10	0.413	15.6	1.723
6	5	10	0.413	15.6	1.986
7	15	10	0.413	15.6	2.224

cabbage dry weight
File: 5701bw 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	2.653	1.621	1.684
2	0.06	10	3.031	1.738	1.684
3	0.19	10	2.887	1.694	1.684
4	0.56	10	2.493	1.575	1.575
5	1.67	10	0.930	0.955	0.955
6	5	10	0.667	0.810	0.810
7	15	10	0.429	0.650	0.650

cabbage dry weight
File: 5701bw 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	1.684				
0.06	1.684	1.141		1.67	k= 1, v=63
0.19	1.684	1.141		1.75	k= 2, v=63
0.56	**1.575**	**0.809**		**1.77**	**k= 3, v=63**
1.67	0.955	11.916	*	1.78	k= 4, v=63
5	0.810	14.518	*	1.79	k= 5, v=63
15	0.650	17.388	*	1.79	k= 6, v=63

s = 0.125
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	**0.072**	**0.029**	**0.17**	**0.19**	**0.41**
EC10	0.14	0.064	0.30	0.17	0.46
EC25	**0.42**	**0.24**	**0.74**	**0.12**	**0.56**
EC50	1.4	0.98	2.1	0.082	0.69

Slope = 1.26 Std.Err. = 0.123

!!!Poor fit: p < 0.001 based on DF= 4.00 63.0

5701BW : cabbage dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	2.65	3.02	-0.368	100.	0.00

0.0600	10.0	3.03	2.90	0.134	95.9	4.08
0.190	10.0	2.89	2.62	0.270	86.6	13.4
0.560	10.0	2.49	2.10	0.388	69.7	30.3
1.67	10.0	0.930	1.41	-0.479	46.6	53.4
5.00	10.0	0.667	0.743	-0.0767	24.6	75.4
15.0	10.0	0.429	0.298	0.131	9.85	90.2

corn length
File: 5701nl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	20805.863	4161.173	49.139
Within (Error)	49	4149.396	84.682	
Total	54	24955.259		

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

corn length
File: 5701nl 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	74.030	74.030		
2	**0.06**	**72.730**	**72.730**	**0.316**	
3	0.19	62.980	62.980	2.685	*
4	0.56	67.170	67.170	1.667	
5	1.67	34.310	34.310	9.652	*
6	5	14.720	14.720	11.767	*

Bonferroni T table value = 2.42 (1 Tailed Value, P=0.05, df=40,5)

corn length
File: 5701nl 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	0.06	10	9.976	13.5	1.300
3	0.19	10	9.976	13.5	11.050
4	0.56	10	9.976	13.5	6.860
5	1.67	10	9.976	13.5	39.720
6	5	5	12.218	16.5	59.310

Corn length
File: 5701nl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	74.030	74.030	74.030
2	0.06	10	72.730	72.730	72.730
3	0.19	10	62.980	62.980	65.075
4	0.56	10	67.170	67.170	65.075
5	1.67	10	34.310	34.310	34.310
6	5	5	14.720	14.720	14.720

Corn length
File: 5701nl 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	74.030				
0.06	72.730	0.316		1.68	k= 1, v=49
0.19	65.075	2.176	*	1.76	k= 2, v=49
0.56	65.075	2.176	*	1.79	k= 3, v=49
1.67	34.310	9.652	*	1.80	k= 4, v=49
5	14.720	11.767	*	1.80	k= 5, v=49

s = 9.202
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	**0.27**	**0.15**	**0.47**	**0.12**	**0.57**
EC10	0.41	0.25	0.65	0.10	0.63
EC25	**0.82**	**0.59**	**1.1**	**0.070**	**0.72**
EC50	1.8	1.5	2.2	0.043	0.82

Slope = 2.00 Std.Err. = 0.234

!!!Poor fit: p = 0.011 based on DF= 3.0 49.

5701NL : corn length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	74.0	71.9	2.10	100.	0.00
0.0600	10.0	72.7	71.8	0.918	99.8	0.163
0.190	10.0	63.0	70.1	-7.07	97.4	2.61
0.560	10.0	67.2	60.6	6.59	84.2	15.8

1.67	10.0	34.3	37.6	-3.24	52.2	47.8
5.00	5.00	14.7	13.3	1.42	18.5	81.5

corn dry weight
File: 5701nw Transform: 1/(SQUARE ROOT(Y))

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	6.967	1.393	73.316
Within (Error)	49	0.932	0.019	
Total	54	7.899		

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

corn dry weight
File: 5701nw Transform: 1/(SQUARE ROOT(Y))

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	0.535	3.718		
2	0.06	0.569	3.373	-0.549	
3	0.19	0.646	2.801	-1.805	
4	0.56	0.624	2.680	-1.444	
5	1.67	0.974	1.135	-7.115	
6	5	1.793	0.319	-16.658	

Bonferroni T table value = 2.42 (1 Tailed Value, P=0.05, df=40,5)

corn dry weight
File: 5701nw Transform: 1/(SQUARE ROOT(Y))

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	0.06	10	-3.231	-86.9	0.345
3	0.19	10	-3.231	-86.9	0.917
4	0.56	10	-3.231	-86.9	1.038
5	1.67	10	-3.231	-86.9	2.583
6	5	5	-4.575	-123.1	3.399

corn dry weight
File: 5701nw Transform: 1/(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	3.718	0.535	0.535
2	0.06	10	3.373	0.569	0.569
3	0.19	10	2.801	0.646	0.635
4	0.56	10	2.680	0.624	0.635
5	1.67	10	1.135	0.974	0.974
6	5	5	0.319	1.793	1.793

corn dry weight
File: 5701nw Transform: 1/(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	0.535				
0.06	0.569	0.549		1.68	k= 1, v=49
0.19	0.635	1.624		1.76	k= 2, v=49
0.56	**0.635**	**1.624**		**1.79**	**k= 3, v=49**
1.67	0.974	7.113	*	1.80	k= 4, v=49
5	1.793	16.654	*	1.80	k= 5, v=49

s = 0.138
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	**0.15**	**0.059**	**0.39**	**0.20**	**0.39**
EC10	0.23	0.10	0.52	0.17	0.45
EC25	**0.47**	**0.27**	**0.84**	**0.12**	**0.56**
EC50	1.0	0.73	1.5	0.079	0.69

Slope = 1.96 Std.Err. = 0.337

Goodness of fit: p = 0.30 based on DF= 3.0 49.

5701NW : corn dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	3.72	3.45	0.263	100.	0.00
0.0600	10.0	3.37	3.43	-0.0555	99.2	0.755
0.190	10.0	2.80	3.20	-0.400	92.7	7.35
0.560	10.0	2.68	2.43	0.252	70.3	29.7
1.67	10.0	1.14	1.20	-0.0598	34.6	65.4
5.00	5.00	0.319	0.318	0.00102	9.21	90.8

cucumber length
File: 5701cl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	569.840	94.973	27.275
Within (Error)	60	208.932	3.482	
Total	66	778.772		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

cucumber length
File: 5701cl 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	20.750	20.750		
2	0.06	19.560	19.560	1.426	
3	0.19	20.190	20.190	0.671	
4	0.56	17.810	17.810	3.523	*
5	1.67	15.060	15.060	6.818	*
6	5	13.270	13.270	8.963	*
7	15	13.500	13.500	7.884	*

Bonferroni T table value = 2.46 (1 Tailed Value, P=0.05, df=60,6)

cucumber length
File: 5701cl 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	0.06	10	2.055	9.9	1.190
3	0.19	10	2.055	9.9	0.560
4	0.56	10	2.055	9.9	2.940
5	1.67	10	2.055	9.9	5.690
6	5	10	2.055	9.9	7.480
7	15	7	2.265	10.9	7.250

cucumber length
File: 5701cl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	20.750	20.750	20.750
2	0.06	10	19.560	19.560	19.875
3	0.19	10	20.190	20.190	19.875
4	0.56	10	17.810	17.810	17.810
5	1.67	10	15.060	15.060	15.060
6	5	10	13.270	13.270	13.365
7	15	7	13.500	13.500	13.365

cucumber length
File: 5701cl 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	20.750				
0.06	19.875	1.048		1.67	k= 1, v=60
0.19	**19.875**	**1.048**		**1.75**	**k= 2, v=60**
0.56	17.810	3.523	*	1.77	k= 3, v=60
1.67	15.060	6.818	*	1.78	k= 4, v=60
5	13.365	8.850	*	1.79	k= 5, v=60
15	13.365	8.031	*	1.79	k= 6, v=60

s = 1.866
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.028**	**0.0039**	**0.21**	**0.43**	**0.14**
EC10	0.14	0.030	0.64	0.33	0.22
EC25	**1.9**	**0.83**	**4.4**	**0.18**	**0.43**
EC50	36.	17.	73.	0.16	0.49

Slope = 0.531 Std.Err. = 0.0844

!!!Poor fit: p = 0.0031 based on DF= 4.0 60.

5701CL : cucumber length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	20.8	21.2	-0.406	100.	0.00
0.0600	10.0	19.6	19.7	-0.107	93.0	7.04
0.190	10.0	20.2	18.8	1.44	88.6	11.4
0.560	10.0	17.8	17.6	0.229	83.1	16.9
1.67	10.0	15.1	16.1	-1.02	76.0	24.0
5.00	10.0	13.3	14.3	-1.01	67.5	32.5

15.0	7.00	13.5	12.3	1.24	57.9	42.1

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

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

cucumber dry weight
File: 5701cw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	27.346	4.558	19.232
Within (Error)	60	14.194	0.237	
Total	66	41.540		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

cucumber dry weight
File: 5701cw 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	2.696	2.696		
2	0.06	2.230	2.230	2.143	
3	0.19	2.646	2.646	0.230	
4	0.56	2.061	2.061	2.916	*
5	1.67	1.443	1.443	5.754	*
6	5	1.084	1.084	7.405	*
7	15	1.023	1.023	6.974	*

Bonferroni T table value = 2.46 (1 Tailed Value, P=0.05, df=60,6)

cucumber dry weight
File: 5701cw 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	0.06	10	0.536	19.9	0.467
3	0.19	10	0.536	19.9	0.050
4	0.56	10	0.536	19.9	0.635
5	1.67	10	0.536	19.9	1.253
6	5	10	0.536	19.9	1.612
7	15	7	0.591	21.9	1.673

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cucumber dry weight
File: 5701cw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	2.696	2.696	2.696
2	0.06	10	2.230	2.230	2.438
3	0.19	10	2.646	2.646	2.438
4	0.56	10	2.061	2.061	2.061
5	1.67	10	1.443	1.443	1.443
6	5	10	1.084	1.084	1.084
7	15	7	1.023	1.023	1.023

cucumber dry weight
File: 5701cw 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	2.696				
0.06	2.438	1.188		1.67	k= 1, v=60
0.19	**2.438**	**1.188**		**1.75**	**k= 2, v=60**
0.56	2.061	2.918	*	1.77	k= 3, v=60
1.67	1.443	5.759	*	1.78	k= 4, v=60
5	1.084	7.412	*	1.79	k= 5, v=60
15	1.023	6.980	*	1.79	k= 6, v=60

s = 0.486
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	**0.025**	**0.0029**	**0.22**	**0.47**	**0.12**
EC10	0.074	0.012	0.45	0.39	0.17
EC25	**0.46**	**0.14**	**1.5**	**0.26**	**0.30**
EC50	3.5	1.8	7.0	0.15	0.51

Slope = 0.765 Std.Err. = 0.137

!!!Poor fit: p = 0.016 based on DF= 4.0 60.

5701CW : cucumber dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change

0.00	10.0	2.70	2.71	-0.0167	100.	0.00
0.0600	10.0	2.23	2.47	-0.245	91.2	8.80
0.190	10.0	2.65	2.26	0.383	83.4	16.6
0.560	10.0	2.06	1.98	0.0825	72.9	27.1
1.67	10.0	1.44	1.62	-0.179	59.8	40.2
5.00	10.0	1.08	1.23	-0.147	45.4	54.6
15.0	7.00	1.02	0.855	0.168	31.5	68.5

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

lettuce length
File: 570111 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	1620.570	270.095	95.037
Within (Error)	63	179.025	2.842	
Total	69	1799.595		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

lettuce length
File: 570111 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	16.680	16.680		
2	0.06	15.780	15.780	1.194	
3	0.19	16.520	16.520	0.212	
4	0.56	13.790	13.790	3.833	*
5	1.67	7.940	7.940	11.593	*
6	5	5.500	5.500	14.829	*
7	15	5.340	5.340	15.041	*

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

lettuce length
File: 570111 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	0.06	10	1.772	10.6	0.900
3	0.19	10	1.772	10.6	0.160
4	0.56	10	1.772	10.6	2.890

5	1.67	10	1.772	10.6	8.740
6	5	10	1.772	10.6	11.180
7	15	10	1.772	10.6	11.340

lettuce length
File: 570111 Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	16.680	16.680	16.680
2	0.06	10	15.780	15.780	16.150
3	0.19	10	16.520	16.520	16.150
4	0.56	10	13.790	13.790	13.790
5	1.67	10	7.940	7.940	7.940
6	5	10	5.500	5.500	5.500
7	15	10	5.340	5.340	5.340

lettuce length
File: 570111 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	16.680				
0.06	16.150	0.703		1.67	k= 1, v=63
0.19	**16.150**	**0.703**		**1.75**	**k= 2, v=63**
0.56	13.790	3.834	*	1.77	k= 3, v=63
1.67	7.940	11.593	*	1.78	k= 4, v=63
5	5.500	14.830	*	1.79	k= 5, v=63
15	5.340	15.042	*	1.79	k= 6, v=63

s = 1.686
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	**0.033**	**0.0094**	**0.12**	**0.27**	**0.29**
EC10	0.085	0.029	0.24	0.23	0.35
EC25	**0.41**	**0.20**	**0.87**	**0.16**	**0.48**
EC50	2.4	1.5	3.7	0.096	0.64

Slope = 0.883 Std.Err. = 0.0957

!!!Poor fit: p < 0.001 based on DF= 4.00 63.0

5701LL : lettuce length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	16.7	17.5	-0.845	100.	0.00
0.0600	10.0	15.8	16.1	-0.367	92.1	7.87
0.190	10.0	16.5	14.6	1.89	83.5	16.5
0.560	10.0	13.8	12.5	1.32	71.2	28.8
1.67	10.0	7.94	9.73	-1.79	55.5	44.5
5.00	10.0	5.50	6.82	-1.32	38.9	61.1
15.0	10.0	5.34	4.23	1.11	24.1	75.9

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

lettuce dry weight
File: 57011w Transform: SQUARE ROOT(Y)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	5.218	0.870	48.333
Within (Error)	63	1.161	0.018	
Total	69	6.379		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

lettuce dry weight
File: 57011w 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	1.100	1.234		
2	0.06	1.029	1.088	1.190	
3	0.19	1.066	1.161	0.573	
4	0.56	0.886	0.799	3.572	*
5	1.67	0.603	0.367	8.292	*
6	5	0.482	0.242	10.300	*
7	15	0.398	0.170	11.703	*

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

lettuce dry weight
File: 57011w 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

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1	control	10			
2	0.06	10	0.290	23.5	0.146
3	0.19	10	0.290	23.5	0.073
4	0.56	10	0.290	23.5	0.435
5	1.67	10	0.290	23.5	0.867
6	5	10	0.290	23.5	0.992
7	15	10	0.290	23.5	1.064

lettuce dry weight
File: 57011w 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	1.234	1.100	1.100
2	0.06	10	1.088	1.029	1.047
3	0.19	10	1.161	1.066	1.047
4	0.56	10	0.799	0.886	0.886
5	1.67	10	0.367	0.603	0.603
6	5	10	0.242	0.482	0.482
7	15	10	0.170	0.398	0.398

lettuce dry weight
File: 57011w 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	1.100				
0.06	1.047	0.872		1.67	k= 1, v=63
0.19	**1.047**	**0.872**		**1.75**	**k= 2, v=63**
0.56	0.886	3.531	*	1.77	k= 3, v=63
1.67	0.603	8.197	*	1.78	k= 4, v=63
5	0.482	10.182	*	1.79	k= 5, v=63
15	0.398	11.569	*	1.79	k= 6, v=63

s = 0.136
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.028**	**0.0067**	**0.11**	**0.31**	**0.24**
EC10	0.060	0.018	0.20	0.27	0.29
EC25	**0.22**	**0.087**	**0.55**	**0.20**	**0.40**
EC50	0.92	0.50	1.7	0.13	0.54

Slope = 1.08 Std.Err. = 0.139

!!!Poor fit: p = 0.025 based on DF= 4.0 63.

5701LW : lettuce dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	1.23	1.28	-0.0437	100.	0.00
0.0600	10.0	1.09	1.15	-0.0620	90.0	10.0
0.190	10.0	1.16	0.984	0.177	77.0	23.0
0.560	10.0	0.799	0.757	0.0427	59.2	40.8
1.67	10.0	0.367	0.498	-0.131	39.0	61.0
5.00	10.0	0.242	0.273	-0.0311	21.4	78.6
15.0	10.0	0.170	0.122	0.0482	9.52	90.5

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

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

onion length
File: 5701ol Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	1291.474	215.246	16.665
Within (Error)	61	787.871	12.916	
Total	67	2079.345		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

onion length
File: 5701ol 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	25.060	25.060		
2	0.06	25.000	25.000	0.037	
3	0.19	23.330	23.330	1.076	
4	0.56	24.410	24.410	0.404	
5	1.67	22.520	22.520	1.580	
6	5	15.370	15.370	6.029	*
7	15	13.300	13.300	6.898	*

Bonferroni T table value = 2.46 (1 Tailed Value, P=0.05, df=60,6)

onion length
File: 5701ol 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	0.06	10	3.959	15.8	0.060
3	0.19	10	3.959	15.8	1.730
4	0.56	10	3.959	15.8	0.650
5	1.67	10	3.959	15.8	2.540
6	5	10	3.959	15.8	9.690
7	15	8	4.199	16.8	11.760

onion length
File: 5701o1 Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	25.060	25.060	25.060
2	0.06	10	25.000	25.000	25.000
3	0.19	10	23.330	23.330	23.870
4	0.56	10	24.410	24.410	23.870
5	1.67	10	22.520	22.520	22.520
6	5	10	15.370	15.370	15.370
7	15	8	13.300	13.300	13.300

onion length
File: 5701o1 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	25.060				
0.06	25.000	0.037		1.67	k= 1, v=61
0.19	23.870	0.740		1.75	k= 2, v=61
0.56	23.870	0.740		1.77	k= 3, v=61
1.67	**22.520**	**1.580**		**1.78**	**k= 4, v=61**
5	15.370	6.029	*	1.79	k= 5, v=61
15	13.300	6.898	*	1.79	k= 6, v=61

s = 3.594
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.40**	**0.10**	**1.6**	**0.29**	**0.26**
EC10	0.89	0.31	2.6	0.23	0.35
EC25	**3.4**	**1.9**	**6.2**	**0.13**	**0.55**

EC50	15.	9.9	22.	0.089	0.67

Slope = 1.05 Std.Err. = 0.208

Goodness of fit: p = 0.11 based on DF= 4.0 61.

5701OL : onion length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	25.1	25.1	-0.0259	100.	0.00
0.0600	10.0	25.0	24.9	0.0644	99.4	0.599
0.190	10.0	23.3	24.5	-1.17	97.7	2.34
0.560	10.0	24.4	23.4	1.02	93.3	6.75
1.67	10.0	22.5	21.1	1.43	84.1	15.9
5.00	10.0	15.4	17.3	-1.95	69.1	30.9
15.0	8.00	13.3	12.5	0.790	49.9	50.1

onion dry weight
File: 5701ow Transform: 1/(SQUARE ROOT(Y))

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	40.725	6.788	18.496
Within (Error)	61	22.374	0.367	
Total	67	63.099		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

onion dry weight
File: 5701ow Transform: 1/(SQUARE ROOT(Y))

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	2.851	0.141		
2	0.06	2.864	0.139	-0.051	
3	0.19	2.781	0.135	0.257	
4	0.56	2.718	0.152	0.488	
5	1.67	3.064	0.120	-0.788	
6	5	4.011	0.065	-4.284	
7	15	5.072	0.042	-7.731	

Bonferroni T table value = 2.46 (1 Tailed Value, P=0.05, df=60,6)

onion dry weight
File: 5701ow Transform: 1/(SQUARE ROOT(Y))

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	0.06	10	-0.087	-61.3	0.002
3	0.19	10	-0.087	-61.3	0.006
4	0.56	10	-0.087	-61.3	-0.010
5	1.67	10	-0.087	-61.3	0.022
6	5	10	-0.087	-61.3	0.076
7	15	8	-0.095	-67.0	0.099

onion dry weight
File: 5701ow Transform: 1/(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	0.141	2.851	2.804
2	0.06	10	0.139	2.864	2.804
3	0.19	10	0.135	2.781	2.804
4	0.56	10	0.152	2.718	2.804
5	1.67	10	0.120	3.064	3.064
6	5	10	0.065	4.011	4.011
7	15	8	0.042	5.072	5.072

onion dry weight
File: 5701ow Transform: 1/(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	2.804				
0.06	2.804	0.174		1.67	k= 1, v=61
0.19	2.804	0.174		1.75	k= 2, v=61
0.56	2.804	0.174		1.77	k= 3, v=61
1.67	**3.064**	**0.788**		**1.78**	**k= 4, v=61**
5	4.011	4.286	*	1.79	k= 5, v=61
15	5.072	7.733	*	1.79	k= 6, v=61

s = 0.606
Note: df used for table values are approximate when v > 20.

Estimates of EC5

Parameter	Estimate	95% Bounds Lower	95% Bounds Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.50**	**0.10**	**2.5**	**0.35**	**0.20**

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EC10	0.86	0.23	3.3	0.29	0.26
EC25	**2.1**	**0.86**	**5.2**	**0.20**	**0.41**
EC50	5.7	3.4	9.7	0.11	0.59

Slope = 1.56 Std.Err. = 0.422

Goodness of fit: p = 0.64 based on DF= 4.0 61.

5701OW : onion dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	0.141	0.144	-0.00232	100.	0.00
0.0600	10.0	0.139	0.144	-0.00421	99.9	0.101
0.190	10.0	0.135	0.142	-0.00698	98.9	1.05
0.560	10.0	0.152	0.135	0.0162	94.2	5.77
1.67	10.0	0.120	0.115	0.00495	79.8	20.2
5.00	10.0	0.0655	0.0772	-0.0117	53.7	46.3
15.0	8.00	0.0421	0.0370	0.00510	25.8	74.2

oat length
File: 5701al Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	11493.288	1915.548	100.543
Within (Error)	59	1124.097	19.052	
Total	65	12617.385		

Critical F value = 2.34 (0.05,6,40)
Since F > Critical F REJECT Ho:All groups equal

oat length
File: 5701al 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	48.540	48.540		
2	0.06	45.660	45.660	1.475	
3	0.19	49.370	49.370	-0.425	
4	0.56	47.900	47.900	0.328	
5	1.67	30.580	30.580	9.201	*
6	5	18.660	18.660	15.307	*
7	15	14.783	14.783	14.976	*

Bonferroni T table value = 2.48 (1 Tailed Value, P=0.05, df=50,6)

oat length
File: 5701a1 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	0.06	10	4.837	10.0	2.880
3	0.19	10	4.837	10.0	-0.830
4	0.56	10	4.837	10.0	0.640
5	1.67	10	4.837	10.0	17.960
6	5	10	4.837	10.0	29.880
7	15	6	5.585	11.5	33.757

oat length
File: 5701a1 Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	48.540	48.540	48.540
2	0.06	10	45.660	45.660	47.643
3	0.19	10	49.370	49.370	47.643
4	0.56	10	47.900	47.900	47.643
5	1.67	10	30.580	30.580	30.580
6	5	10	18.660	18.660	18.660
7	15	6	14.783	14.783	14.783

oat length
File: 5701a1 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	48.540				
0.06	47.643	0.459		1.68	k= 1, v=59
0.19	47.643	0.459		1.76	k= 2, v=59
0.56	**47.643**	**0.459**		**1.79**	**k= 3, v=59**
1.67	30.580	9.201	*	1.80	k= 4, v=59
5	18.660	15.307	*	1.80	k= 5, v=59
15	14.783	14.976	*	1.81	k= 6, v=59

s = 4.365
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds	Std.Err.	Lower Bound

39

		Lower	Upper		/Estimate
EC5	**0.16**	**0.078**	**0.35**	**0.16**	**0.47**
EC10	0.33	0.18	0.62	0.14	0.53
EC25	**1.0**	**0.68**	**1.6**	**0.093**	**0.65**
EC50	3.8	3.0	4.8	0.054	0.78

Slope = 1.21 Std.Err. = 0.116

!!!Poor fit: p < 0.001 based on DF= 4.00 59.0

5701AL : oat length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	48.5	49.7	-1.20	100.	0.00
0.0600	10.0	45.7	49.0	-3.35	98.5	1.48
0.190	10.0	49.4	46.8	2.52	94.2	5.82
0.560	10.0	47.9	41.9	6.02	84.2	15.8
1.67	10.0	30.6	33.1	-2.55	66.6	33.4
5.00	10.0	18.7	22.0	-3.31	44.2	55.8
15.0	6.00	14.8	11.7	3.11	23.5	76.5

oat dry weight
File: 5701aw Transform: NATURAL LOG(Y)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	41.847	6.975	139.500
Within (Error)	59	2.945	0.050	
Total	65	44.792		

Critical F value = 2.34 (0.05,6,40)
Since F > Critical F REJECT Ho:All groups equal

oat dry weight
File: 5701aw Transform: NATURAL LOG(Y)

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	0.266	1.320		
2	0.06	0.235	1.281	0.312	
3	0.19	0.336	1.433	-0.692	
4	0.56	0.256	1.324	0.103	
5	1.67	-0.653	0.547	9.190	*
6	5	-1.455	0.235	17.213	*
7	15	-1.832	0.163	18.175	*

Bonferroni T table value = 2.48 (1 Tailed Value, P=0.05, df=50,6)

oat dry weight
File: 5701aw Transform: NATURAL LOG(Y)

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	0.06	10	0.287	21.7	0.039
3	0.19	10	0.287	21.7	-0.113
4	0.56	10	0.287	21.7	-0.005
5	1.67	10	0.287	21.7	0.773
6	5	10	0.287	21.7	1.085
7	15	6	0.325	24.6	1.157

oat dry weight
File: 5701aw Transform: NATURAL LOG(Y)

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	1.320	0.266	0.279
2	0.06	10	1.281	0.235	0.279
3	0.19	10	1.433	0.336	0.279
4	0.56	10	1.324	0.256	0.256
5	1.67	10	0.547	-0.653	-0.653
6	5	10	0.235	-1.455	-1.455
7	15	6	0.163	-1.832	-1.832

oat dry weight
File: 5701aw Transform: NATURAL LOG(Y)

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	0.279				
0.06	0.279	0.127		1.68	k= 1, v=59
0.19	0.279	0.127		1.76	k= 2, v=59
0.56	**0.256**	**0.103**		**1.79**	**k= 3, v=59**
1.67	-0.653	9.197	*	1.80	k= 4, v=59
5	-1.455	17.227	*	1.80	k= 5, v=59
15	-1.832	18.190	*	1.81	k= 6, v=59

s = 0.223
Note: df used for table values are approximate when v > 20.

Estimates of EC%

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Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.16**	**0.074**	**0.35**	**0.17**	**0.46**
EC10	0.27	0.14	0.52	0.14	0.51
EC25	**0.63**	**0.39**	**1.0**	**0.11**	**0.61**
EC50	1.6	1.2	2.3	0.070	0.72

Slope = 1.63 Std.Err. = 0.182

!!!Poor fit: p < 0.001 based on DF= 4.00 59.0

5701AW : oat dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	1.32	1.40	-0.0830	100.	0.00
0.0600	10.0	1.28	1.39	-0.109	99.0	0.962
0.190	10.0	1.43	1.31	0.120	93.6	6.38
0.560	10.0	1.32	1.09	0.236	77.6	22.4
1.67	10.0	0.547	0.692	-0.145	49.3	50.7
5.00	10.0	0.235	0.300	-0.0648	21.4	78.6
15.0	6.00	0.163	0.0813	0.0822	5.79	94.2

radish length
File: 5701rl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	722.031	144.406	47.896
Within (Error)	50	150.725	3.015	
Total	55	872.756		

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

radish length
File: 5701rl 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	13.970	13.970		
2	0.06	14.700	14.700	-0.940	
3	**0.19**	**15.300**	**15.300**	**-1.713**	
4	0.56	9.900	9.900	5.241	*
5	1.67	7.260	7.260	8.641	*
6	5	5.600	5.600	9.335	*

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

radish length
File: 5701rl 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	0.06	10	1.867	13.4	-0.730
3	0.19	10	1.867	13.4	-1.330
4	0.56	10	1.867	13.4	4.070
5	1.67	10	1.867	13.4	6.710
6	5	6	2.156	15.4	8.370

radish length
File: 5701rl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	13.970	13.970	14.657
2	0.06	10	14.700	14.700	14.657
3	0.19	10	15.300	15.300	14.657
4	0.56	10	9.900	9.900	9.900
5	1.67	10	7.260	7.260	7.260
6	5	6	5.600	5.600	5.600

radish length
File: 5701rl 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	14.657				
0.06	14.657	0.884		1.68	k= 1, v=50
0.19	14.657	0.884		1.76	k= 2, v=50
0.56	9.900	5.242	*	1.79	k= 3, v=50
1.67	7.260	8.642	*	1.80	k= 4, v=50
5	5.600	9.335	*	1.80	k= 5, v=50

s = 1.736
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds	Std.Err.	Lower Bound

		Lower	Upper		/Estimate
EC5	**0.074**	**0.023**	**0.24**	**0.26**	**0.31**
EC10	0.15	0.058	0.40	0.21	0.38
EC25	**0.51**	**0.27**	**0.97**	**0.14**	**0.53**
EC50	2.0	1.4	2.8	0.078	0.70

Slope = 1.16 Std.Err. = 0.177

!!!Poor fit: p < 0.001 based on DF= 3.00 50.0

5701RL : radish length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	14.0	15.0	-1.03	100.	0.00
0.0600	10.0	14.7	14.4	0.301	96.0	4.00
0.190	10.0	15.3	13.2	2.11	87.9	12.1
0.560	10.0	9.90	11.0	-1.13	73.6	26.4
1.67	10.0	7.26	7.99	-0.729	53.3	46.7
5.00	6.00	5.60	4.80	0.803	32.0	68.0

radish dry weight
File: 5701rw Transform: 1/(SQUARE ROOT(Y))

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	3.395	0.679	33.950
Within (Error)	50	1.022	0.020	
Total	55	4.417		

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

radish dry weight
File: 5701rw Transform: 1/(SQUARE ROOT(Y))

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	1.057	0.958		
2	0.06	1.000	1.009	0.890	
3	0.19	1.012	1.011	0.703	
4	0.56	1.367	0.545	-4.914	
5	1.67	1.583	0.409	-8.321	
6	5	1.563	0.429	-6.939	

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

radish dry weight
File: 5701rw Transform: 1/(SQUARE ROOT(Y))

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	0.06	10	-0.326	-34.1	-0.050
3	0.19	10	-0.326	-34.1	-0.053
4	0.56	10	-0.326	-34.1	0.414
5	1.67	10	-0.326	-34.1	0.550
6	5	6	-0.393	-41.0	0.529

radish dry weight
File: 5701rw Transform: 1/(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	0.958	1.057	1.023
2	0.06	10	1.009	1.000	1.023
3	0.19	10	1.011	1.012	1.023
4	0.56	10	0.545	1.367	1.367
5	1.67	10	0.409	1.583	1.576
6	5	6	0.429	1.563	1.576

radish dry weight
File: 5701rw Transform: 1/(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	1.023				
0.06	1.023	0.526		1.68	k= 1, v=50
0.19	**1.023**	**0.526**		**1.76**	**k= 2, v=50**
0.56	1.367	4.862	*	1.79	k= 3, v=50
1.67	1.576	8.119	*	1.80	k= 4, v=50
5	1.576	7.031	*	1.80	k= 5, v=50

s = 0.143
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.028**	**0.0045**	**0.18**	**0.40**	**0.16**
EC10	0.068	0.015	0.31	0.33	0.22

EC25	**0.29**	**0.10**	**0.81**	**0.22**	**0.36**
EC50	1.5	0.81	2.6	0.13	0.55

Slope = 0.962 Std.Err. = 0.187

!!!Poor fit: p < 0.001 based on DF= 3.00 50.0

5701RW : radish dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	0.958	1.04	-0.0818	100.	0.00
0.0600	10.0	1.01	0.945	0.0633	90.9	9.12
0.190	10.0	1.01	0.835	0.176	80.3	19.7
0.560	10.0	0.545	0.682	-0.137	65.5	34.5
1.67	10.0	0.409	0.497	-0.0881	47.7	52.3
5.00	6.00	0.429	0.316	0.113	30.3	69.7

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

soybean length
File: 5701sl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	4816.673	802.779	118.789
Within (Error)	63	425.745	6.758	
Total	69	5242.418		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

soybean length
File: 5701sl 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	41.610	41.610		
2	0.06	42.220	42.220	-0.525	
3	0.19	41.520	41.520	0.077	
4	0.56	33.710	33.710	6.795	*
5	1.67	25.230	25.230	14.089	*
6	5	23.510	23.510	15.569	*
7	15	23.050	23.050	15.964	*

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

soybean length
File: 5701sl 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	0.06	10	2.732	6.6	-0.610
3	0.19	10	2.732	6.6	0.090
4	0.56	10	2.732	6.6	7.900
5	1.67	10	2.732	6.6	16.380
6	5	10	2.732	6.6	18.100
7	15	10	2.732	6.6	18.560

soybean length
File: 5701sl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	41.610	41.610	41.915
2	0.06	10	42.220	42.220	41.915
3	0.19	10	41.520	41.520	41.520
4	0.56	10	33.710	33.710	33.710
5	1.67	10	25.230	25.230	25.230
6	5	10	23.510	23.510	23.510
7	15	10	23.050	23.050	23.050

soybean length
File: 5701sl 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	41.915				
0.06	41.915	0.262		1.67	k= 1, v=63
0.19	**41.520**	**0.077**		**1.75**	**k= 2, v=63**
0.56	33.710	6.795	*	1.77	k= 3, v=63
1.67	25.230	14.089	*	1.78	k= 4, v=63
5	23.510	15.569	*	1.79	k= 5, v=63
15	23.050	15.965	*	1.79	k= 6, v=63

s = 2.600
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds	Std.Err.	Lower Bound

		Lower	Upper		/Estimate
EC5	**0.019**	**0.0043**	**0.082**	**0.32**	**0.23**
EC10	0.076	0.023	0.25	0.26	0.31
EC25	**0.79**	**0.38**	**1.6**	**0.16**	**0.48**
EC50	11.	7.0	16.	0.092	0.66

Slope = 0.598 Std.Err. = 0.0655

!!!Poor fit: p < 0.001 based on DF= 4.00 63.0

5701SL : soybean length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	41.6	43.8	-2.22	100.	0.00
0.0600	10.0	42.2	39.9	2.31	91.1	8.95
0.190	10.0	41.5	37.3	4.18	85.2	14.8
0.560	10.0	33.7	34.1	-0.376	77.8	22.2
1.67	10.0	25.2	30.0	-4.78	68.5	31.5
5.00	10.0	23.5	25.3	-1.81	57.8	42.2
15.0	10.0	23.1	20.4	2.69	46.5	53.5

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

soybean dry weight
File: 5701sw Transform: SQUARE ROOT(Y)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	14.719	2.453	102.208
Within (Error)	63	1.497	0.024	
Total	69	16.216		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

soybean dry weight
File: 5701sw 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	2.068	4.299		
2	0.06	2.052	4.256	0.238	
3	0.19	2.055	4.254	0.184	
4	0.56	1.764	3.131	4.385	*
5	1.67	1.229	1.525	12.111	*
6	5	0.993	1.000	15.522	*

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7	15	1.045	1.099	14.768 *

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

soybean dry weight
File: 5701sw 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	0.06	10	0.647	15.1	0.043
3	0.19	10	0.647	15.1	0.045
4	0.56	10	0.647	15.1	1.168
5	1.67	10	0.647	15.1	2.773
6	5	10	0.647	15.1	3.298
7	15	10	0.647	15.1	3.200

soybean dry weight
File: 5701sw 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	4.299	2.068	2.068
2	0.06	10	4.256	2.052	2.054
3	0.19	10	4.254	2.055	2.054
4	0.56	10	3.131	1.764	1.764
5	1.67	10	1.525	1.229	1.229
6	5	10	1.000	0.993	1.019
7	15	10	1.099	1.045	1.019

soybean dry weight
File: 5701sw 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	2.068				
0.06	2.054	0.212		1.67	k= 1, v=63
0.19	**2.054**	**0.212**		**1.75**	**k= 2, v=63**
0.56	1.764	4.407	*	1.77	k= 3, v=63
1.67	1.229	12.169	*	1.78	k= 4, v=63
5	1.019	15.218	*	1.79	k= 5, v=63
15	1.019	15.218	*	1.79	k= 6, v=63

s = 0.154
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	**0.021**	**0.0059**	**0.077**	**0.28**	**0.28**
EC10	0.052	0.017	0.16	0.24	0.33
EC25	**0.24**	**0.11**	**0.53**	**0.18**	**0.45**
EC50	1.3	0.76	2.1	0.11	0.60

Slope = 0.928 Std.Err. = 0.0995

!!!Poor fit: p < 0.001 based on DF= 4.00 63.0

5701SW : soybean dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	4.30	4.66	-0.359	100.	0.00
0.0600	10.0	4.26	4.15	0.110	89.0	11.0
0.190	10.0	4.25	3.62	0.633	77.7	22.3
0.560	10.0	3.13	2.93	0.204	62.8	37.2
1.67	10.0	1.53	2.12	-0.595	45.5	54.5
5.00	10.0	1.00	1.35	-0.349	29.0	71.0
15.0	10.0	1.10	0.743	0.356	15.9	84.1

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

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

tomato length
File: 5701tl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	6693.604	1115.601	95.155
Within (Error)	51	597.935	11.724	
Total	57	7291.539		

Critical F value = 2.34 (0.05,6,40)
Since F > Critical F REJECT Ho:All groups equal

tomato length
File: 5701tl 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	36.920	36.920		

50

2	0.06	34.060	34.060	1.868	
3	0.19	35.900	35.900	0.666	
4	0.56	24.320	24.320	8.228	*
5	1.67	14.560	14.560	14.602	*
6	5	8.250	8.250	16.215	*
7	15	8.000	8.000	10.904	*

Bonferroni T table value = 2.48 (1 Tailed Value, P=0.05, df=50,6)

tomato length
File: 5701tl 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	0.06	10	3.794	10.3	2.860
3	0.19	10	3.794	10.3	1.020
4	0.56	10	3.794	10.3	12.600
5	1.67	10	3.794	10.3	22.360
6	5	6	4.382	11.9	28.670
7	15	2	6.572	17.8	28.920

tomato length
File: 5701tl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	36.920	36.920	36.920
2	0.06	10	34.060	34.060	34.980
3	0.19	10	35.900	35.900	34.980
4	0.56	10	24.320	24.320	24.320
5	1.67	10	14.560	14.560	14.560
6	5	6	8.250	8.250	8.250
7	15	2	8.000	8.000	8.000

tomato length
File: 5701tl 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	36.920				
0.06	34.980	1.267		1.68	k= 1, v=51
0.19	**34.980**	**1.267**		**1.76**	**k= 2, v=51**
0.56	24.320	8.228	*	1.79	k= 3, v=51
1.67	14.560	14.602	*	1.80	k= 4, v=51

5	8.250	16.214	*	1.80	k= 5, v=51
15	8.000	10.904	*	1.81	k= 6, v=51

s = 3.424
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.044**	**0.019**	**0.10**	**0.18**	**0.43**
EC10	0.091	0.045	0.19	0.15	0.49
EC25	**0.31**	**0.19**	**0.51**	**0.11**	**0.60**
EC50	1.2	0.88	1.6	0.068	0.73

Slope = 1.15 Std.Err. = 0.107

!!!Poor fit: p < 0.001 based on DF= 4.00 51.0

5701TL : tomato length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	36.9	38.1	-1.16	100.	0.00
0.0600	10.0	34.1	35.5	-1.43	93.2	6.81
0.190	10.0	35.9	31.2	4.65	82.0	18.0
0.560	10.0	24.3	24.7	-0.351	64.8	35.2
1.67	10.0	14.6	16.6	-2.00	43.5	56.5
5.00	6.00	8.25	9.10	-0.853	23.9	76.1
15.0	2.00	8.00	3.98	4.02	10.5	89.5

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

tomato dry weight
File: 5701tw Transform: NO TRANSFORM

KRUSKAL-WALLIS ANOVA BY RANKS - TABLE 1 OF 2

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	RANK SUM
1	control	2.843	2.843	445.000
2	0.06	2.484	2.484	409.000
3	0.19	2.711	2.711	436.000
4	0.56	1.287	1.287	247.000
5	1.67	0.402	0.402	127.000
6	5	0.218	0.218	31.000
7	15	0.285	0.285	16.000

Calculated H Value = 45.825 Critical H Value Table = 12.590
Since Calc H > Crit H REJECT Ho:All groups are equal.

tomato dry weight
File: 5701tw Transform: NO TRANSFORM

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DUNNS MULTIPLE COMPARISON - KRUSKAL-WALLIS - TABLE 2 OF 2

GROUP	IDENTIFICATION	TRANSFORMED MEAN	ORIGINAL MEAN	GROUP 0 6	0 7	0 5	0 4	0 2	0 3	0 1
6	5	0.218	0.218	\						
7	15	0.285	0.285	.	\					
5	1.67	0.402	0.402	.	.	\				
4	0.56	1.287	1.287	.	.	.	\			
2	0.06	2.484	2.484	*	.	*	.	\		
3	0.19	2.711	2.711	*	.	*	.	.	\	
1	**control**	**2.843**	**2.843**	*	.	*	.	.	.	\

* = significant difference (p=0.05) . = no significant difference
Table q value (0.05,7) = 3.038 Unequal reps - multiple SE values

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**0.041**	**0.013**	**0.13**	**0.26**	**0.31**
EC10	0.071	0.025	0.20	0.22	0.36
EC25	**0.18**	**0.082**	**0.39**	**0.17**	**0.46**
EC50	0.50	0.29	0.83	0.11	0.59

Slope = 1.52 Std.Err. = 0.229

!!!Poor fit: p < 0.001 based on DF= 4.00 51.0

5701TW : tomato dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	2.84	2.94	-0.0960	100.	0.00
0.0600	10.0	2.48	2.70	-0.214	91.8	8.19
0.190	10.0	2.71	2.16	0.548	73.6	26.4
0.560	10.0	1.29	1.37	-0.0876	46.8	53.2
1.67	10.0	0.402	0.621	-0.219	21.1	78.9
5.00	6.00	0.218	0.187	0.0317	6.35	93.6
15.0	2.00	0.285	0.0359	0.249	1.22	98.8

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

wheat length
File: 5701w1 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	468.716	78.119	11.277
Within (Error)	63	436.382	6.927	

Total	69	905.098

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

wheat length
File: 5701wl 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	28.020	28.020		
2	0.06	31.300	31.300	-2.787	
3	0.19	29.720	29.720	-1.444	
4	0.56	29.460	29.460	-1.223	
5	1.67	28.160	28.160	-0.119	
6	5	26.430	26.430	1.351	
7	15	22.670	22.670	4.545	*

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

wheat length
File: 5701wl 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	0.06	10	2.766	9.9	-3.280
3	0.19	10	2.766	9.9	-1.700
4	0.56	10	2.766	9.9	-1.440
5	1.67	10	2.766	9.9	-0.140
6	5	10	2.766	9.9	1.590
7	15	10	2.766	9.9	5.350

wheat length
File: 5701wl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	28.020	28.020	29.680
2	0.06	10	31.300	31.300	29.680
3	0.19	10	29.720	29.720	29.680
4	0.56	10	29.460	29.460	29.460
5	1.67	10	28.160	28.160	28.160
6	5	10	26.430	26.430	26.430
7	15	10	22.670	22.670	22.670

wheat length
File: 5701wl 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	29.680				
0.06	29.680	1.410		1.67	k= 1, v=63
0.19	29.680	1.410		1.75	k= 2, v=63
0.56	29.460	1.223		1.77	k= 3, v=63
1.67	28.160	0.119		1.78	k= 4, v=63
5	**26.430**	**1.351**		**1.79**	**k= 5, v=63**
15	22.670	4.545	*	1.79	k= 6, v=63

s = 2.632
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**1.9**	**0.63**	**6.0**	**0.25**	**0.32**
EC10	4.3	2.1	9.0	0.16	0.48
EC25	**16.**	**11.**	**24.**	**0.086**	**0.67**
EC50	72.	27.	2.0E+02	0.22	0.37

Slope = 1.05 Std.Err. = 0.290

Goodness of fit: p = 0.12 based on DF= 4.0 63.

5701WL : wheat length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	28.0	29.7	-1.69	100.	0.00
0.0600	10.0	31.3	29.7	1.61	99.9	0.0623
0.190	10.0	29.7	29.6	0.116	99.7	0.343
0.560	10.0	29.5	29.3	0.155	98.7	1.35
1.67	10.0	28.2	28.4	-0.262	95.7	4.32
5.00	10.0	26.4	26.4	0.0540	88.8	11.2
15.0	10.0	22.7	22.7	0.00831	76.3	23.7

!!!Warning: EC25 not bracketed by doses evaluated.

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

wheat dry weight
File: 5701ww Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	1.346	0.224	5.895
Within (Error)	63	2.388	0.038	
Total	69	3.734		

Critical F value = 2.25 (0.05,6,60)
Since F > Critical F REJECT Ho:All groups equal

wheat dry weight
File: 5701ww 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	0.708	0.708		
2	0.06	0.786	0.786	-0.900	
3	0.19	0.873	0.873	-1.893	
4	0.56	0.951	0.951	-2.790	
5	1.67	0.791	0.791	-0.950	
6	**5**	**0.726**	**0.726**	**-0.205**	
7	15	0.477	0.477	2.643	*

Dunnett table value = 2.35 (1 Tailed Value, P=0.05, df=60,6)

wheat dry weight
File: 5701ww 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	0.06	10	0.205	28.9	-0.078
3	0.19	10	0.205	28.9	-0.165
4	0.56	10	0.205	28.9	-0.243
5	1.67	10	0.205	28.9	-0.083
6	5	10	0.205	28.9	-0.018
7	15	10	0.205	28.9	0.230

wheat dry weight
File: 5701ww Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	10	0.708	0.708	0.829

2	0.06	10	0.786	0.786	0.829
3	0.19	10	0.873	0.873	0.829
4	0.56	10	0.951	0.951	0.829
5	1.67	10	0.791	0.791	0.791
6	5	10	0.726	0.726	0.726
7	15	10	0.477	0.477	0.477

wheat dry weight
File: 5701ww 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	0.829				
0.06	0.829	1.398		1.67	k= 1, v=63
0.19	0.829	1.398		1.75	k= 2, v=63
0.56	0.829	1.398		1.77	k= 3, v=63
1.67	0.791	0.951		1.78	k= 4, v=63
5	0.726	0.205		1.79	k= 5, v=63
15	0.477	2.646	*	1.79	k= 6, v=63

s = 0.195
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err.	Lower Bound /Estimate
EC5	**2.9**	**0.74**	**11.**	**0.29**	**0.26**
EC10	4.3	1.6	12.	0.22	0.36
EC25	**8.7**	**5.2**	**15.**	**0.11**	**0.59**
EC50	19.	12.	29.	0.098	0.64

Slope = 2.01 Std.Err. = 0.840

Goodness of fit: p = 0.089 based on DF= 4.0 63.

5701WW : wheat dry weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	10.0	0.708	0.826	-0.118	100.	0.00
0.0600	10.0	0.786	0.826	-0.0395	100.	2.53e-05
0.190	10.0	0.873	0.826	0.0471	100.	0.00295
0.560	10.0	0.951	0.825	0.126	99.9	0.107
1.67	10.0	0.791	0.812	-0.0210	98.3	1.72
5.00	10.0	0.726	0.724	0.00194	87.6	12.4
15.0	10.0	0.477	0.477	3.59e-05	57.8	42.2

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

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