US EPA ARCHIVE DOCUMENT

Text Searchable File

US EPA ARCHIVE DOCUMENT

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

1. CHEMICAL: Penoxsulam PC Code No.: ~~199031~~ 119031

2. TEST MATERIAL: XDE-638 Purity: 19.6%

3. CITATION:

Author: Schwab, D.

Title: Effects of XDE-638 on the Emergence and Vegetative Vigor of Non-Target Terrestrial Plants (Tier II)

Study Completion Date: February 27, 2001

Laboratory: ABC Laboratories, Inc.
Analytical Chemistry and Field Studies
7200 E. ABC Lane
Columbia, Missouri 65202-8015

Sponsor: Dow AgroSciences LLC
Global Environmental Chemistry Laboratory
9330 Zionsville Road
Indianapolis, Indiana 46268-1054

Laboratory Report ID: 46089

MRID No.: 45831116

DP Barcode: D288160

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

Signature: Rebecca Bryan **Date:** 12/19/03

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

Signature: [signature] **Date:** 12/19/03

5. APPROVED BY:

Signature: Goodyear **Date:**

2051788

study.

EXECUTIVE SUMMARY:

Seedling emergence and vegetative vigor were studied on 10 plant species after application of Penoxsulam (XDE-638) at varying concentrations.

The effect of XDE-638 on the seedling emergence and vegetative vigor of dicot (*Gossypium hirsutum,* cotton; *Cucumis sativus,* cucumber; *Beta vulgaris altissima,* sugarbeet; *Brassica oleracea acephala,* kale; *Glycine max,* soybean; and *Lycopersicon esculentum*, tomato) and monocot (*Zea mays,* corn; *Triticum aestivum,* wheat; *Lolium perenne,* ryegrass; and *Allium cepa*, onion) crops was studied at nominal concentrations of 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha. The growth medium used in the seedling emergence and vegetative vigor test was natural soil (sandy loam, pH 6.4, organic carbon 1.2%). On day 21, the surviving plants per pot were recorded and cut at soil level for measuring the plant height and dry weight in the seedling emergence and vegetative vigor test, respectively.

The **seedling emergence** test was performed at rates of 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha (for corn and wheat), 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha (for cotton, cucumber, kale, onion, ryegrass, soybean, and tomato), and 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha (soybean). Corn, cotton, cucumber, ryegrass, soybean, and wheat were not sensitive to treatment (as defined by inhibition of 25% or greater for at least one endpoint). Of the species that were sensitive to treatment with Penoxsulam, onion (a monocot) was the most sensitive species (based on shoot weight) with an EC_{25} of **1.1 g a.i./ha; the NOAEC value for this species was 0.41 g a.i./ha**. The most sensitive dicot was sugarbeet (based on shoot weight) with an EC_{25} of **3.2 g a.i./ha; the NOAEC value for this species was 1.2 g a.i./ha**.

The **vegetative vigor** test was performed at rates of 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha (for corn, cotton, cucumber, onion, ryegrass, tomato, and wheat), and 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha (for kale, soybean, and sugarbeet). Corn and wheat were not sensitive to treatment. Of the species that were sensitive to treatment with Penoxsulam, soybean (a dicot) was the most sensitive species (based on shoot weight) with an EC_{25} of **3.9 g a.i./ha; the NOAEC value for this species was 1.2 g a.i./ha**. The most sensitive monocot was ryegrass (based on shoot weight) with an EC_{25} of **17.0 g a.i./ha; the NOAEC value for this species was 0.41 g a.i./ha**.

This study fulfills the US EPA guideline requirements for seedling emergence and vegetative vigor studies (Subdivision J, §123-1 (a & b; TIER II)). This study is classified as **CORE.**

Maximum Labeled Rate: 0.044 lb a.i./A or 49 g a.i./ha

Results Synopsis

	Seedling emergence	**Vegetative vigor**
Monocot		
EC_{25}:	1.1 g ai/ha or 0.00098 lb ai/A	17 g ai/ha or 0.015 lb ai/A
NOAEC:	0.41 g ai/ha or 0.00037 lb ai/A	0.41 g ai/ha or 0.00037 lb ai/A
Probit slope:	0.786	0.419
95% C.I.:	0.17 - 75 g ai/ha	3.5 - 83 g ai/ha
Most sensitive monocot:	Onion	Ryegrass
Most sensitive parameter:	Shoot Weight	Shoot Weight

US EPA ARCHIVE DOCUMENT

Dicot

EC_{25}:	3.2 g ai/ha or 0.0029 lb ai/A	3.9 g ai/ha or 0.0035 lb ai/A
NOAEC:	1.2 g ai/ha or 0.001 lb ai/A	1.2 g ai/ha or 0.001 lb ai/A
Probit slope:	2.16	3.66
95% C.I.:	2.1 - 5.0 g ai/ha	3.4 - 4.6 g ai/ha
Most sensitive dicot:	Sugarbeet	Soybean
Most sensitive parameter:	Shoot Weight	Shoot Weight

This toxicity study is classified as CORE and satisfies the guideline requirement for a Tier II seedling emergence and vegetative vigor toxicity study.

US EPA ARCHIVE DOCUMENT

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study protocol was based on the following guidelines: U.S. EPA Series 850-Ecological Effects Test Guidelines, OPPTS Number 850.4225 and 850.4250 (1996); and U.S. EPA *Standard Evaluation Procedure, Non-Target Plants: Seedling Emergence and Vegetative vigor* (1986). Deviations from FIFRA §123-1a and 123-1b are:

COMPLIANCE: Signed and dated GLP, Quality Assurance, and No Data Confidentiality claims statements were provided. This study was conducted in compliance with the GLP standards of the United States (1989), OECD (1998), and Japan (1999).

A. MATERIALS:

1. Test Material XDE-638

Description: Liquid (oil)

Lot No./Batch No. : E495-69

Purity: 19.6

Stability of compound under test conditions: n/a

Storage conditions of test chemicals: The test material was stored under ambient conditions.

Physicochemical Properties of XDE-638

Parameter	Values	Comments
Water solubility at 20°C		
Vapour pressure		
UV absorption		
pKa		
Kow		

2. Test organism:

Monocotyledonous species: *Zea mays,* corn; *Triticum aestivum,* wheat; *Lolium perenne,* ryegrass; and *Allium cepa*, onion

Dicotyledonous species: *Gossypium hirsutum,* cotton; *Cucumis sativus,* cucumber; *Beta vulgaris altissima,* sugarbeet; *Brassica oleracea acephala,* kale; *Glycine max,* soybean; and *Lycopersicon esculentum*, tomato

Seed source: Delta and Pine Land Seed (cotton); Novartis Seed (corn); Chesmore Seed Co. (cucumber); Henry Field's Seeds (kale); Virginia Crop Imp. Assoc. (wheat); Henry Field's Seeds (onion and tomato); Betaseed Inc. (sugarbeet); The Scotts Co. (ryegrass);

US EPA ARCHIVE DOCUMENT

and KS Foundation Seeds (soybean).

Prior seed treatment/sterilization: Cotton seeds were soaked in a 10% bleach solution for removal of fungus and insects.

Historical % germination of seed: >80%

Seed storage, if any: None

B. STUDY DESIGN:

1. Experimental Conditions

a) Range-finding Study: None

b) Definitive Study

Table 1. Experimental Parameters - Seedling Emergence and Vegetative Vigour

Parameters	Seedling Emergence		Vegetative Vigour	
	Details	**Remarks**	**Details**	**Remarks**
Duration of the test	21 days	*Recommended test duration is 14 days.*	21 days	
Number of seeds/plants/species/ replicate	6 seeds per pot for onion, ryegrass, and wheat (2 pots per replicate); 4 seeds per pot for kale, sugarbeet, and tomato (3 pots per replicate); and 3 seeds per pot for corn, cucumber, cotton, and soybean (4 pots per replicate).	*Ten seeds per replicate should be used.* *OECD recommends a minimum of five seeds planted in each replicate within 24 hours of incorporation of the test substance. All seeds of each species for each test should be of the same size class. The seed should not be imbibed.*	6 plants per pot for onion, ryegrass, and wheat (1 pot per replicate); 3 plants per pot for kale, tomato, and sugarbeet (2 pot per replicate); and 2 plants per pot for corn, cucumber, cotton, and soybean (3 pots per replicate).	*Five plants per replicate are recommended .*
Number of plants retained after thinning	none		none	
Number of replicates Control: Solvent control: Treated ones:	 3 per replicate none 3 per replicate	*Three replicates per dose should be used.* *OECD recommends a minimum of four*	 3 per replicate none 6 per replicate	---------- *At least 3 replicates per dose* are *recommended*

US EPA ARCHIVE DOCUMENT

Parameters	Seedling Emergence		Vegetative Vigour	
	Details	**Remarks**	**Details**	**Remarks**
		replicates per treatment		
Test concentrations (mg ai/kg soil and g ai/ha) Nominal:	3X progression 0, 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha or 0, 0.000013, 0.000041, 0.000125, 0.00037, 0.001, 0.003, 0.0099, 0.03, and 0.089 lb a.i./A.	Some plants were not tested up to the maximum application rate of 49 g ai/ha or 0.044 lb ai/A. *Five test concentrations should be used with a dose range of 2X or 3X progression*	3X progression 0, 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha or 0, 0.000013, 0.000041, 0.000125, 0.00037, 0.001, 0.003, 0.0099, 0.03, and 0.089 lb a.i./A.	Some plants were not tested up to the maximum application rate of 49 g ai/ha or 0.044 lb ai/A. *Five test concentrations should be used with a dose range of 2X or 3X progression*
Method and interval of analytical verification LOQ: LOD:	Not reported		Not reported	
Solvent (type, percentage, if used)	none		none	
Test container (pot) Size/Volume Material: (glass/polystyrene)	Number 12-Nu Pots 4 in^2 x 4.75 in deep material not reported	*Nnon-porous containers should be used.* *OECD recommends that non-porous plastic or glazed pot be used..*	Number 12-Nu Pots 4 in^2 x 4.75 in deep material not reported	*Non-porous containers should be used.* *OECD recommends that non-porous plastic or glazed pots be used.*
Growth facility	greenhouse		greenhouse	
Method/depth of seeding	Not reported		Not reported	
Test material application: Application time including the plant	hand-watered followed by bottom-watering 48 hrs after		hand-watered followed by bottom-watering. 48 hrs after	Final 2 days, cotton, onion, and wheat were top-watered underneath the

US EPA ARCHIVE DOCUMENT

Parameters	Seedling Emergence		Vegetative Vigour	
	Details	**Remarks**	**Details**	**Remarks**
growth stage Number of application Application interval Method of application	planted 1 none overhead track sprayer		planted 1 none overhead track sprayer	foliage. Height of sprayer was adjusted for the height of the plant canopy.
Details of soil used Geographic location Depth of soil collection Soil texture % sand % silt % clay pH: % organic carbon CEC Moisture at 1/3 atm (%)	 n/a Sandy loam 54% 32% 14% 6.4 1.2 11.2 meq/100 g 17%	*Soil mixes containing sandy loam, loam, or clay loam soil with no greater than 2% organic matte are preferable. Glass beads, rock wool, and 100% acid washed sand are not preferred.* *OECD prefers the soil to be sieved (0.5 cm) to remove coarse fragments. Carbon content should not exceed 1.5% (3% organic matter). Fine particles (under 20um) makeup should be between 10 and 20%. The recommended pH is between 5.0 and 7.5.*	 n/a Sandy loam 54% 32% 14% 6.4 1.2 11.2 meq/100 g 17%	*EPA prefers soil mixes containing sandy loam, loam, or clay loam soil with no greater than 2% organic matter. Glass beads, rock wool, and 100% acid washed sand are not preferred..* *OECD prefers the soil to be sieved (0.5 cm) to remove coarse fragments. Carbon content should not exceed 1.5% (3% organic matter). Fine particles (under 20um) makeup should be between 10 and 20%. The recommended pH is between 5.0 and 7.5.*
Details of nutrient medium, if used	Not reported		Not reported	
Watering regime and schedules Water source/type: Volume applied: Interval of application: Method of application:	 Boone County District #9 none bottom-watering	*EPA prefers that bottom watering be utilized for seedling emergence studies so that the chemical is not leached out of the soil during the test.*	 bottom-watering	*EPA prefers that under foliage watering or bottom watering be utilized for vegetative vigor studies so that the chemical is not washed out of the soil during the test.*
Any pest control method/fertilization, if used	On Day 14, Peters 20:20:20 fertilizer at rate of 1T per gallon of water was		On Day 14, Peters 20:20:20 fertilizer at rate of 1T per gallon of water was	

US EPA ARCHIVE DOCUMENT

Parameters	Seedling Emergence		Vegetative Vigour	
	Details	**Remarks**	**Details**	**Remarks**
	applied.		applied.	
Test conditions Temperature: Photoperiod: Light intensity and quality: Relative humidity:	 15.2 to 37.8°C natural sunlight n/a 35.9 to 100%	*EPA prefers that the cold vs warm loving plants be tested in two separate groups to optimize plant growth.* *OECD prefers that the temperature, humidity and light conditions be suitable for maintaining normal growth of each species for the test period.*	 15.2 to 37.8°C natural sunlight n/a 35.9 to 100%	*EPA prefers that the cold vs warm loving plants be tested in two separate groups to optimize plant growth.* *OECD prefers that the temperature, humidity and light conditions be suitable for maintaining normal growth of each species for the test period.*
Reference chemical (if used) Name: Concentrations:	n/a		n/a	
Other parameters, if any	n/a		n/a	

2. Observations:

Table 2: Observation Parameters - Seedling Emergence and Vegetative Vigour

Parameters	Seedling Emergence	Vegetative Vigour

US EPA ARCHIVE DOCUMENT

	Details	Remarks	Details	Remarks
Parameters measured (e.g., number of germinated seeds, emerged seedlings, plant height, dry weight or other endpoints)	# of emerged seedling (weekly), % final emergence, shoot length and dry weight, and phytotoxicity observations.		Shoot weight and length, plant survival and phytotoxicity observations.	
Measurement technique for each parameter	nearest millimeter using a ruler		nearest millimeter using a ruler	
Observation intervals	weekly		weekly	
Other observations, if any	n/a		n/a	
Were raw data included?	yes		yes	
Phytotoxicity rating system, if used	yes		yes	

II. RESULTS and DISCUSSION:

A. INHIBITORY EFFECTS:

1. Seedling Emergence:

Corn: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha.

Emergence rates ranged from 97-100% for all treatment groups by 21 days; slight stunting in all doses ≥0.41 g ai/ha.

The percent effects on shoot length were -1, -6, -3, -9, -2, -5, and -5% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control.. The effects for 3.7 g ai/ha was statistically significant, however, not biologically significant.

The percent effects on shoot weight were -3,-6,-6,-6,-3,-4, and -7% for 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g ai/ha treatment groups compared to control.

Cotton: Doses tested: 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha.

Emergence rates ranged from 81-92% for all treatment groups compared to control emergence of 86%. Slight stunting in ≥3.7 g ai/ha treatment group, however, more pronounced in 33.3 g ai/ha.

US EPA ARCHIVE DOCUMENT

The percent effects on shoot length were 5, 4, 0, -1,-6,-3, and -24% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control. The effects in 33.3 g ai/ha was statistically significant.

The percent effects on shoot weight were -1, 8, 3, 11, 7, 2, and -20% for 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g ai/ha, respectively, compared to control.

Cucumber: Doses tested: 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha.

Emergence rates ranged from 97-100% for all treatment groups compared to control. Slight stunting was observed in ≥3.7 g ai/ha treatment group. The effect in 11.1 g ai/ha was statistically significant but not biologically significant.

The percent effects on shoot length were -1, 4, -3, -3, -4, -2, and -15% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control. The effects in 33.3 g ai/ha was statistically significant.

The percent effects on shoot weight were 1, 0, -4, 3, 3, -11, -13% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control.

Kale: Doses tested: 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha.

Emergence rates were 97, 94, 92, 83, 94, 86, and 75% for 0.046, 0.14, 0.41, 1.2, 3.4, 11.1, and 33.3 g ai/ha treatment groups, respectively, compared to control emergence of 94%. Slight stunting in ≥3.7 g ai/ha, more pronounced in 11.1 and 33.3 g ai/ha.

The percent effects on shoot length were 5, 5, 2, 6, 3, -23, and 62% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control. The effects in 11.1 and 33.3 g ai/ha groups were statistically significant.

The percent effects on shoot weight were 4, 1, -1, -2, -8, -42, -77% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control. The effects in 11.1 and 33.3 g ai/ha were statistically significant.

Onion: Doses tested: 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha.

Emergence rates were 81, 83, 78, 69, 64, 58, and 44% for 0.046, 0.14, 0.41, 1.2, 3.4, 11.1, and 33.3 g ai/ha treatment groups, respectively, compared to control emergence of 81%. Slight stunting in ≥1.2 g ai/ha, more pronounced in ≥11.1 g ai/ha.

The percent effects on shoot length were 2, -3, -10, -12, -13, -36, and -43% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control. The effects in 11.1 and 33.3 g ai/ha were statistically significant.

The percent effects on shoot weight were -7, 3, -14, -32, -32, -59, and -66% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control. The effects in 1.2, 3.7, 11.1, and 33.3 g ai/ha treatment groups were statistically significant, however, in 1.2 and 3.7 g ai/ha, the effects were not biologically significant.

US EPA ARCHIVE DOCUMENT

Ryegrass: Doses tested: 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha.

Emergence rates were 75, 72, 81, 78, 53, 61% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g ai/ha treatment groups, respectively, compared to control emergence of 69%. Slight stunting in ≥11.1 g ai/ha and statistically significant in 33.3 g ai/ha.

The percent effects on shoot length were -11, -2, 9, -9, 2, 0, and -26% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control.

The percent effects on shoot weight were -4, 21, 60, -13, 41, 22, and -19% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control.

Soybean: Doses tested: 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha.

Emergence rates ranged from 92-100% for all treatment groups compared to control. Slight stunting at ≥11.1 g ai/ha and statistically significant in 33.3 g ai/ha where all 3 replicates were affected.

The percent effects on shoot length were -3, -10, -5, 0, 2, -17, and -5% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control.

The percent effects on shoot weight were 6, 2, -4, -1, 1, -23, and -7% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 treatment groups, respectively, compared to control.

Sugarbeet: Doses tested: 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha.

Emergence rates were 94, 92, 89, 97, 89, 94, and 61% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g ai/ha treatment groups, respectively, compared to control. Slight stunting in 0.014 to 3.7 g ai/ha and statistically significant at ≥1.2 g ai/ha with moderate stunting in 11.1 g ai/ha.

The percent effects on shoot length were -4, -3, -1, -8, -8, -15, and -60% for 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g ai/ha treatment groups, respectively, compared to control. The effects in 11.1 g ai/ha was statistically significant.

The percent effects on shoot weight were -3, 2, -3, -11, -14, -29, and -71% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g ai/ha treatment groups, respectively, compared to control. The effects in 3.7 and 11.1 g ai/ha were statistically significant when compared to control.

Tomato: Doses tested: 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha

Emergence rates were 83, 86, 81, 86, 92, 86, and 81% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha treatment groups, respectively, compared to control emergence of 94%. Stunting in ≥0.14 g ai/ha and statistically significant at 11.1 and 33.3 g ai/ha.

US EPA ARCHIVE DOCUMENT

The percent effects on shoot length were -8, -6, -8, -15, -3, -23, and -45% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha treatment groups, respectively, compared to the control. The length differences in the 11.1 and 33.3 g a.i./ha treatment groups were statistically significant.

The percent effects on shoot weight were -6, 4, 0, -11, 8, -34, and -55% for the 0.046, 0.14, 0.41, 1.2, 3.7, 11.1, and 33.3 g a.i./ha treatment groups, respectively, compared to the control. The weight differences in the 11.1 and 33.3 g a.i./ha treatment groups were statistically significant.

Wheat: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha

Emergence rates ranged from 86-97% for all treatment groups; compared to control emergence of 86%. Slight stunting in 100 g ai/ha was considered statistically significant but not biologically significant.

The percent effects on shoot length were 3, 1, -3, 0, 3, -5, and -7% for the 0.140, 0.410, 1.20, 3.70, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control.

The percent effects on shoot weight were -6, 8, -11, -3, 11, -6, and -22% for the 0.140, 0.410, 1.20, 3.70, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control.

2. Vegetative Vigor:

Corn: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha

No phytotoxicity symptoms were observed.

The percent effects on shoot length were -2, 2, 2, 2, 2, -1, and -6% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The length difference in the 100 g a.i./ha treatment group was statistically significant compared to the control, however, it was not biologically significant.

The percent effects on shoot weight were -4, 0, 0, 1, -1, -4, and -15% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The weight difference in the 100 g a.i./ha treatment group was statistically significant compared to the control.

Cotton: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g ai/ha.

Chlorosis and stunting were observed in ≥1.2 g ai/ha; statistically significant in ≥3.7 g ai/ha; biologically significant in ≥11.1 g ai/ha.

The percent effects on shoot length were -1, -1, 1, -1, -7, -13, and -30% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The length difference in the 11.1, 33.3, and 100 g a.i./ha treatment groups were statistically significant, however, the 11.1 g a.i./ha treatment group effects were not considered biologically significant.

The percent effects on shoot weight were 0, -4, 0, -2, -1, -6, and -24% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The weight difference in the 100 g a.i./ha treatment group was statistically significant compared to the control.

US EPA ARCHIVE DOCUMENT

Cucumber: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g ai/ha.

Slight stunting was observed in 3.7 g ai/ha; slight leaf rolling and slight chlorosis were observed in 11.1 and 33.3 g ai/ha. Moderate to severe stunting and moderate epinasty were observed in 100 g ai/ha. Ten plants died at the highest treatment level.

The percent effects on shoot length were 1, 11, 16, 4, 12, 1, and -45% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The length difference in the 100 g a.i./ha treatment group was statistically significant.

The percent effects on shoot weight were 3, 8, 12, -1, 4,-9, and -55% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The weight difference in the 100 g a.i./ha treatment group was statistically significant.

Kale: Doses tested: 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha

Slight chlorosis and stunting were observed 0.015, 0.046, 0.14 g ai/ha treatment group and control group; more pronounced in 3.7 g ai/ha. The phytotoxicity effects were considered statistically significant at 11.1 g ai/ha.

The percent effects on shoot length were 6, 0, 1, 5, 0, -4, and -25% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha treatment groups, respectively, compared to the control. The length difference in the 11.1 g a.i./ha treatment group was statistically significant.

The percent effects on shoot weight were 8, 1, 1, 12, 5, -1, and -32% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha treatment groups, respectively, compared to the control. The weight difference in the 11.1 g a.i./ha treatment groups were statistically significant.

Onion: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha

Stunting was observed in 1.2, 3.7, and 11.1 g ai/ha treatment groups; more pronounced in 33.3 and 100 g ai/ha. Necrosis was observed in 33.3 g ai/ha; more pronounced in 100 g ai/ha. 2 plants died in 33.3 g ai/ha and 12 plants died in the highest treatment group. The phytotoxicity effects were considered statistically significant in 33.3 and 100 g ai/ha.

The percent effects on shoot length were -6, -3, -6, -8, -15, -25, and -53% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The length differences in the 11.1, 33.3, and 100 g a.i./ha treatment groups were statistically significant.

The percent effects on shoot weight were -5, -1, -3, -3, -17, -23, and -84% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The weight differences in the 33.3 and 100 g a.i./ha treatment groups were statistically significant.

Ryegrass: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g ai/ha.

Slight stunting was observed in 1.2, 3.7, 11.1, 33.3, and 100 g ai/ha treatment groups; statistically significant in 11.1, 33.3, and 100 g ai/ha treatment groups.

The percent effects on shoot length were 2, 1, -8, -6, -5, -1, and -16% for the 0.14, 0.41, 1.2, 3.7, 11.1,

US EPA ARCHIVE DOCUMENT

33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The length difference in the 100 g a.i./ha treatment group was statistically significant.

The percent effects on shoot weight were -15, -6, -13, -17, -29, -24, and -36% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The weight differences in the 0.14, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups were statistically significant.

Soybean: Doses tested: 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha

Slight leaf wrinkle was observed in 1.2 and 3.7 g ai/ha treatment groups; slight stunting was observed in 3.7 g ai/ha; slight to moderate necrosis and stunting were observed in 11.1 g ai/ha treatment group. The phytotoxicity effects were considered statistically significant in 1.2, 3.7, and 11. g ai/ha treatment groups.

The percent effects on shoot length were 5, 8, 5, 7, 7, -13, and -63% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha treatment groups, respectively, compared to the control. The length difference in the 11.1 g a.i./ha treatment group was statistically significant.

The percent effects on shoot weight were 6, 2, 5, -1, 3, -20, and -83% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha treatment groups, respectively, compared to the control. The weight differences in the 3.70 and 11.1 g a.i./ha treatment groups were statistically significant.

Sugarbeet: Doses tested: 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g ai/ha.

Slight stunting was observed in 0.14, 0.41, and 1.2 g ai/ha treatment groups, more pronounced in higher treatment groups; slight to moderate leaf rolling was observed in 3.7 g ai/ha treatment group, more pronounced in higher treatment groups. The phytotoxicity effects were statistically significant in the 3.7 and 11.1 g ai/ha treatment groups.

The percent effects on shoot length were 2, 4, 5, 1, 4, -10, and -37% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha treatment groups, respectively, compared to the control. The length difference in the 11.1 g a.i./ha treatment group was statistically significant.

The percent effects on shoot weight were -2, 6, 1, -7, 3, -20, and -57% for the 0.015, 0.046, 0.14, 0.41, 1.2, 3.7, and 11.1 g a.i./ha treatment groups, respectively, compared to the control. The weight differences in the 3.70 and 11.1 g a.i./ha treatment groups were statistically significant.

Tomato: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g ai/ha.

Slight leaf rolling was observed in 1.2 and 3.7 g ai/ha treatment groups, more pronounced in higher treatment levels; slight stunting was observed in 3.7 g ai/ha group, more pronounced in higher treatment levels; lodging was observed in 33.3 g ai/ha group; severe necrosis was observed in the highest treatment group. The phytotoxicity effects in the 1.2, 3.7, 11.1, 33.3, and 100 g ai/ha treatment groups were statistically significant; however, not biologically significant in the 1.2 g ai/ha treatment group. Mortality of the plants were 1, 4, 7, and 26 for the 3.7, 11.1, 33.3, and 100 g ai/ha treatment groups, respectively.

The percent effects on shoot length were 0, 6, 7, -7, -24, -64, and -74% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The length differences in the 11.1, 33.3, and 100 g a.i./ha treatment groups were statistically significant.

US EPA ARCHIVE DOCUMENT

The percent effects on shoot weight were -4, 2, 12, -14, -32, -76, and -96% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control. The weight differences in the 11.1, 33.3, and 100 g a.i./ha treatment groups were statistically significant.

Wheat: Doses tested: 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha

Slight stunting was observed in the 1.2 g ai/ha treatment group; more pronounced in higher treatment groups. The phytotoxicity effects were statistically significant in 33.3 and 100 g ai/ha groups, respectively; however, was not considered to be biologically significant.

The percent effects on shoot length were 1, 3, -1, 3, 2, -1, and -3% for the 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control.

The percent effects on shoot weight were -4, 11, -2, 7, -11, -12, and -16% for 0.14, 0.41, 1.2, 3.7, 11.1, 33.3, and 100 g a.i./ha treatment groups, respectively, compared to the control.

Table 3: Effect of Penoxsulam on Seedling Emergence

Species	NOAEC, EC_{25} and Slope (g ai/ha)						
	Seedling Emergence	Shoot Length			Shoot Weight		
	%	NOAEC	EC_{25}	Slope	NOAEC	EC_{25}	Slope
Dicots							
Sugarbeet	61 - 97	1.2	5.5	2.9	1.2	3.2	2.16
Kale	75 - 97	3.7	11	2.15	3.7	6.7	2.05
Tomato	81 - 94	3.7	18	1.73	3.7	11	1.78

US EPA ARCHIVE DOCUMENT

Species	NOAEC, EC_{25} and Slope (g ai/ha)						
	Seedling Emergence	Shoot Length			Shoot Weight		
	%	NOAEC	EC_{25}	Slope	NOAEC	EC_{25}	Slope
Cucumber	97 - 100	11.1	>33.3	n/a	3.7	>33.3	n/a
Soybean	94 - 100	33.3	>33.3	n/a	33.3	>33.3	n/a
Cotton	81 - 92	11.1	35	1.5	33.3	>33.3	n/a
Monocots							
Onion	44 - 83	3.7	6.2	0.718	0.41	1.1	0.786
Ryegrass	53 - 89	11.1	>33.3	n/a	33.3	>33.3	n/a
Wheat	86 - 97	100	>100	n/a	100	>100	n/a
Corn	97 - 100	100	>100	n/a	100	>100	n/a

Sugar beet	Kale	Tomato	Cucumber	Soybean	Cotton	Onion	Ryegrass	Wheat	Corn
3 - 53	7 - 63	3 - 30	3 - 13	3 - 23	3 - 27	7 - 40	3 - 13	0 - 7	3 - 7 %

*0-9 No Effect; 10 - 39 Slight Effect; 40 - 69 Moderate Effect; 70 - 100 Severe Effect

Table 4: Effect of Penoxsulam on Vegetative Vigor

Species	NOAEC, EC_{25} and Slope (g ai/ha)					
	Shoot Length			Shoot Weight		
	NOAEC	EC_{25}	Slope	NOAEC	EC_{25}	Slope
Dicots						
Sugarbeet	11.1	20	1.91	1.2	4.6	2.28
Kale	3.7	10	1.89	3.7	8.6	2.58
Tomato	3.7	8.0	1.33	1.2	8.1	2.25

US EPA ARCHIVE DOCUMENT

Species	NOAEC, EC_{25} and Slope (g ai/ha)					
	Shoot Length			Shoot Weight		
	NOAEC	EC_{25}	Slope	NOAEC	EC_{25}	Slope
Cucumber	33.3	63	3.24	33.3	49	2.7
Soybean	3.7	4.4	2.64	1.2	3.9	3.66
Cotton	3.7	73	1.19	33.3	>100	n/a
Monocots						
Onion	3.7	36	1.46	11.1	36	3.71
Ryegrass	33.3	>100	n/a	0.41	17	0.419
Wheat	100	>100	n/a	100	>100	n/a
Corn	100	>100	n/a	33.3	>100	n/a

Sugar beet	Kale	Tomato	Cucumber	Soybean	Cotton	Onion	Ryegrass	Wheat	Corn
3 - 75	7 - 40	10 - 90	3 - 73	15 - 82	3 - 63	2 - 80	3 - 20	3 - 8	0%

*0-9 No Effect; 10 - 39 Slight Effect; 40 - 69 Moderate Effect; 70 - 100 Severe Effect

Table 5: Effect of Penoxsulam on Shoot Weight: Most Sensitive Monocot and Dicot

Statistical endpoint	Seedling emergence	Vegetative vigor
Monocot		
Most sensitive species	Onion	Ryegrass
NOAEC for the most sensitive parameter (e.g., dry weight)	0.41 g ai/ha	0.41 g ai/ha

Statistical endpoint	Seedling emergence	Vegetative vigor
EC_{25} for the most sensitive monocot	1.1	17
Slope for the most sensitive monocot	0.786	0.419
Reference chemical, if any: NOAEC for most sensitive monocot IC_{50}/EC_{50}	n/a	n/a
Dicot:		
Most sensitive species	Sugarbeet	Soybean
NOAEC for the most sensitive parameter (e.g., dry weight)	1.2 g ai/ha	1.2
EC_{25} for the most sensitive dicot	3.2	3.9
Slope for the most sensitive dicot	2.16	3.66
Reference chemical, if any NOAEC for most sensitive dicot IC_{50}/EC_{50}	n/a	n/a

B. REPORTED STATISTICS:

Statistical Method: The final emergence, shoot lengths, and shoot weights were the analyzed endpoints. The data was transferred into an ASCII format "dat.file" and then analyzed (0.05 level of significance). The control mean was compared to treatment means using ANOVA with a Dunnett's test. The EC_{25} and EC_{50} were estimated using the four-parameter logistic curve and non linear least squares.

Sugarbeet and onion were the most sensitive species tested for the effects of XDE-638 on seedling emergence and subsequent plant growth. Sugarbeet was most sensitive considering phytotoxicity rating, shoot length, and shoot weight; onion was also sensitive for shoot weight.

Soybean was the species which was most sensitive to the effects of XDE-638 during the vegetative vigor test.

Seedling Emergence

Most sensitive monocot: Onion
Most sensitive parameter: Shoot weight
EC_{25}: 1.4 g a.i./ha
EC_{50}: 8.5 g a.i./ha
NOAEC: 0.41 g a.i./ha

Most sensitive dicot: Sugarbeet

US EPA ARCHIVE DOCUMENT

Most sensitive parameter: Shoot weight
EC_{25}: 2.5 g a.i./ha
EC_{50}: 6.2 g a.i./ha
NOAEC: 1.2 g a.i./ha

Vegetative Vigor
Most sensitive dicot: Soybean
Most sensitive parameter: Shoot weight
EC_{25}: 4.2 g a.i./ha
EC_{50}: 6.2 g a.i./ha
NOAEC: 1.2 g a.i./ha

C. VERIFICATION OF STATISTICAL RESULTS BY THE REVIEWER:

Statistical Method: Data for plant length, and shoot weight for the seedling emergence and vegetative vigor tests were analyzed to determine the NOAEC, EC_{05}, EC_{25}, and slope values. Continuous data (height and weight) were assessed for normality and homogeneity of variance prior to all analyses. Treatment effects were assessed using Williams' tests. The EC_{25} estimates were done using the Bruce and Versteeg method via Nuthatch software. However, the EC_{25} could not be estimated mathematically for several species and endpoints because a 25% reduction was not observed. Visual analysis was used to determine the effects of phytotoxicity. For a few cases, the NOAEC could be visually determined, as there were no reductions from control.

Seedling Emergence
Most sensitive monocot: Onion
Most sensitive parameter: Shoot weight
NOAEC: 0.41 g a.i./ha
EC_{25}: 1.1 g a.i./ha 95% C.I.: 0.17-7.5 g a.i./ha
Slope: 0.786±0.216

Most sensitive dicot: Sugarbeet
Most sensitive parameter: Shoot weight
NOAEC: 1.2 g a.i./ha
EC_{25}: 3.2 g a.i./ha 95% C.I.: 2.1-5.0 g a.i./ha
Slope: 2.16±0.414

Vegetative Vigor
Most sensitive monocot: Ryegrass
Most sensitive parameter: Shoot weight
NOAEC: 0.41 g a.i./ha

US EPA ARCHIVE DOCUMENT

EC_{25}: 17.0 g a.i./ha 95% C.I.: 3.5-83 g a.i./ha
Slope: 0.419±0.113

Most sensitive dicot: Soybean
Most sensitive parameter: Shoot weight
NOAEC: 1.2 g a.i./ha
EC_{25}: 3.9 g a.i./ha 95% C.I.: 3.4-4.6 g a.i./ha
Slope: 3.66±0.304

D. STUDY DEFICIENCIES:

None

E. REVIEWER'S COMMENTS:

The reviewer's conclusions were similar to those reported by the study author. In the seedling emergence test, onion (a monocot) was the most sensitive species and sugarbeet was the most sensitive dicot. In the vegetative vigor test, soybean (a dicot) was the most sensitive species and ryegrass was the most sensitive monocot. In general, the reviewer's EC_{25} estimates were very similar to the study authors' estimates. In some cases, the NOAEC values differed due to the different methods used (i.e., differences in rounding) to determine this value. Any differences between the reviewer's and study authors' estimates are indicated in the tables above.

Some of the plant species were tested up to 33.3 g ai/ha which is lower than the maximum label rate allowed. The reviewer could not verify the rationale for those species not being tested up to 49 g ai/ha. The study author should supply data from the tier I seedling emergence test showing that the plant species were tested at the maximum application rate of 49 g ai/ha. This will not affect the category of this study due to sufficient dose responses produced by those Tier II studies.

F. CONCLUSIONS: This study fulfills the US EPA guideline requirements for seedling emergence and vegetative vigor studies (Subdivision J, §123-1 (a & b; TIER II)). This study is classified as **CORE.**

This study was conducted in accordance with USEPA Good Laboratory Practice Standards and included a Quality Assurance Statement.

III. REFERENCES: No references were cited.

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

APPENDIX I. OUTPUT FROM REVIEWER'S STATISTICAL VERIFICATION:

SEEDLING EMERGENCE TEST

corn length
File: 1116nl Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	12099.953	1728.565	1.588
Within (Error)	16	17411.821	1088.239	
Total	23	29511.775		

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

corn length
File: 1116nl Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	806.528	806.528	806.528
2	0.140	3	799.222	799.222	799.222
3	0.410	3	757.833	757.833	770.194
4	1.20	3	782.555	782.555	770.194
5	3.70	3	734.778	734.778	766.463
6	11.1	3	794.361	794.361	766.463
7	33.3	3	770.250	770.250	766.463
8	100	3	765.025	765.025	765.025

corn length
File: 1116nl Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

ISOTONIZED	CALC.	SIG	TABLE	DEGREES OF

IDENTIFICATION	MEAN	WILLIAMS	P=.05	WILLIAMS	FREEDOM
control	806.528				
0.140	799.222	0.271		1.75	k= 1, v=16
0.410	770.194	1.349		1.83	k= 2, v=16
1.20	770.194	1.349		1.86	k= 3, v=16
3.70	766.463	1.487		1.87	k= 4, v=16
11.1	766.463	1.487		1.88	k= 5, v=16
33.3	766.463	1.487		1.89	k= 6, v=16
100	**765.025**	**1.541**		**1.89**	**k= 7, v=16**

s = 32.988
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**64.**	**8.0E-09**	**5.1E+11**	**4.8**	**1.3E-10**
EC10	9.0E+07	8.2E-21	9.8E+35	13.	9.2E-29
EC25	**1.7E+18**	**2.2E-50**	**1.3E+86**	**33.**	**1.3E-68**
EC50	4.2E+29	3.9E-84	4.6E+142	54.	9.3E-114

Slope = 0.0591 Std.Err. = 0.113

Goodness of fit: p = 0.22 based on DF= 5.0 16.

1116NL : corn length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	807.	807.	-0.236	100.	0.00
0.140	3.00	799.	778.	21.3	96.4	3.58
0.410	3.00	758.	776.	-18.3	96.2	3.80
1.20	3.00	783.	774.	8.31	96.0	4.03
3.70	3.00	735.	772.	-37.4	95.7	4.29
11.1	3.00	794.	770.	24.3	95.4	4.55
33.3	3.00	770.	768.	2.44	95.2	4.83
100.	3.00	765.	765.	-0.449	94.9	5.12

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

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

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

corn weight

US EPA ARCHIVE DOCUMENT

File: 1116nw Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	1.951	0.279	0.447
Within (Error)	16	9.991	0.624	
Total	23	11.942		

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

corn weight
File: 1116nw Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	12.955	12.955	12.955
2	0.140	3	12.548	12.548	12.548
3	0.410	3	12.227	12.227	12.292
4	1.20	3	12.150	12.150	12.292
5	3.70	3	12.151	12.151	12.292
6	11.1	3	12.558	12.558	12.292
7	33.3	3	12.376	12.376	12.292
8	100	3	12.017	12.017	12.017

corn weight
File: 1116nw Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	12.955				
0.140	12.548	0.631		1.75	k= 1, v=16
0.410	12.292	1.027		1.83	k= 2, v=16
1.20	12.292	1.027		1.86	k= 3, v=16

US EPA ARCHIVE DOCUMENT

Between	7	9380.383	1340.055	2.560
Within (Error)	16	8375.967	523.498	
Total	23	17756.350		

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

cotton length
File: 1116cl Transform: NO TRANSFORMATION
cotton length
File: 1116cl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	233.607	233.607	241.012
2	0.046	3	246.222	246.222	241.012
3	0.140	3	243.208	243.208	241.012
4	0.410	3	234.070	234.070	234.070
5	1.20	3	231.818	231.818	231.818
6	3.70	3	219.791	219.791	222.745
7	11.1	3	225.698	225.698	222.745
8	33.3	3	178.781	178.781	178.781

cotton length
File: 1116cl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	241.012				
0.046	241.012	0.396		1.75	k= 1, v=16
0.140	241.012	0.396		1.83	k= 2, v=16
0.410	234.070	0.025		1.86	k= 3, v=16
1.20	231.818	0.096		1.87	k= 4, v=16
3.70	222.745	0.581		1.88	k= 5, v=16
11.1	**222.745**	**0.581**		**1.89**	**k= 6, v=16**
33.3	178.781	2.935	*	1.89	k= 7, v=16

US EPA ARCHIVE DOCUMENT

S = 22.880
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**8.0**	**1.6**	**41.**	**0.34**	**0.20**
EC10	14.	4.9	40.	0.22	0.35
EC25	**35.**	**20.**	**62.**	**0.12**	**0.57**
EC50	1.0E+02	23.	4.3E+02	0.31	0.23

Slope = 1.50 Std.Err. = 0.829

Goodness of fit: p = 0.86 based on DF= 5.0 16.

1116CL : cotton length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	234.	236.	-2.88	100.	0.00
0.0460	3.00	246.	236.	9.74	100.	2.89e-05
0.140	3.00	243.	236.	6.72	100.	0.000959
0.410	3.00	234.	236.	-2.37	100.	0.0175
1.20	3.00	232.	236.	-4.19	99.8	0.201
3.70	3.00	220.	233.	-12.9	98.4	1.61
11.1	3.00	226.	218.	7.33	92.3	7.66
33.3	3.00	179.	180.	-1.45	76.2	23.8

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

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

cotton weight
File: 1116cw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	7.830	1.119	1.465
Within (Error)	16	12.229	0.764	
Total	23	20.059		

US EPA ARCHIVE DOCUMENT

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

cotton weight
File: 1116cw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	6.400	6.400	6.711
2	0.046	3	6.457	6.457	6.711
3	0.140	3	6.908	6.908	6.711
4	0.410	3	6.587	6.587	6.711
5	1.20	3	7.102	7.102	6.711
6	3.70	3	6.814	6.814	6.711
7	11.1	3	6.537	6.537	6.537
8	33.3	3	5.099	5.099	5.099

cotton weight
File: 1116cw 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	6.711				
0.046	6.711	0.436		1.75	k= 1, v=16
0.140	6.711	0.436		1.83	k= 2, v=16
0.410	6.711	0.436		1.86	k= 3, v=16
1.20	6.711	0.436		1.87	k= 4, v=16
3.70	6.711	0.436		1.88	k= 5, v=16
11.1	6.537	0.191		1.89	k= 6, v=16
33.3	**5.099**	**1.823**		**1.89**	**k= 7, v=16**

s = 0.874
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound

US EPA ARCHIVE DOCUMENT

EC5	**15.**	**2.3**	**95.**	**0.39**	**0.15**
EC10	20.	6.2	66.	0.25	0.31
EC25	**34.**	**23.**	**51.**	**0.084**	**0.67**
EC50	62.	15.	2.6E+02	0.30	0.24

Slope = 2.64 Std.Err. = 2.84

Goodness of fit: p = 0.93 based on DF= 5.0 16.

1116CW : cotton weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	6.40	6.71	-0.311	100.	0.00
0.0460	3.00	6.46	6.71	-0.254	100.	1.32e-14
0.140	3.00	6.91	6.71	0.197	100.	1.52e-10
0.410	3.00	6.59	6.71	-0.124	100.	4.61e-07
1.20	3.00	7.10	6.71	0.391	100.	0.000318
3.70	3.00	6.81	6.71	0.107	99.9	0.0633
11.1	3.00	6.54	6.54	-0.00818	97.5	2.47
33.3	3.00	5.10	5.10	0.000597	76.0	24.0

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

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

cucumber length

File: 1116ul Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	3932.603	561.800	2.244
Within (Error)	16	4006.293	250.393	
Total	23	7938.896		

Critical F value = 2.66 (0.05,7,16)

Since F < Critical F FAIL TO REJECT Ho:All groups equal

cucumber length

US EPA ARCHIVE DOCUMENT

File: 1116ul Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	247.433	247.433	249.848
2	0.046	3	245.028	245.028	249.848
3	0.140	3	257.083	257.083	249.848
4	0.410	3	240.583	240.583	240.764
5	1.20	3	240.944	240.944	240.764
6	3.70	3	238.139	238.139	239.806
7	11.1	3	241.472	241.472	239.806
8	33.3	3	209.477	209.477	209.477

cucumber length
File: 1116ul Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	249.848				
0.046	249.848	0.187		1.75	k= 1, v=16
0.140	249.848	0.187		1.83	k= 2, v=16
0.410	240.764	0.516		1.86	k= 3, v=16
1.20	240.764	0.516		1.87	k= 4, v=16
3.70	239.806	0.590		1.88	k= 5, v=16
11.1	**239.806**	**0.590**		**1.89**	**k= 6, v=16**
33.3	209.477	2.938	*	1.89	k= 7, v=16

s = 15.824
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**18.**	**5.8**	**54.**	**0.23**	**0.33**
EC10	26.	15.	44.	0.11	0.59
EC25	**50.**	**23.**	**1.1E+02**	**0.17**	**0.45**
EC50	1.0E+02	14.	7.5E+02	0.41	0.14

Slope = 2.15 Std.Err. = 1.76

US EPA ARCHIVE DOCUMENT

Goodness of fit: p = 0.74 based on DF= 5.0 16.

1116UL : cucumber length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	247.	245.	2.38	100.	0.00
0.0460	3.00	245.	245.	-0.0291	100.	3.13e-11
0.140	3.00	257.	245.	12.0	100.	3.69e-08
0.410	3.00	241.	245.	-4.47	100.	1.26e-05
1.20	3.00	241.	245.	-4.11	100.	0.00162
3.70	3.00	238.	245.	-6.69	99.9	0.0947
11.1	3.00	241.	240.	0.984	98.1	1.86
33.3	3.00	209.	210.	-0.0885	85.5	14.5

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

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

cucumber weight

File: 1116uw Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	8.221	1.174	2.743
Within (Error)	16	6.851	0.428	
Total	23	15.072		

Critical F value = 2.66 (0.05,7,16)

Since F > Critical F REJECT Ho:All groups equal

cucumber weight

File: 1116uw Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN

US EPA ARCHIVE DOCUMENT

1	control	3	9.895	9.895	9.947
2	0.046	3	9.998	9.998	9.947
3	0.140	3	9.895	9.895	9.933
4	0.410	3	9.489	9.489	9.933
5	1.20	3	10.196	10.196	9.933
6	3.70	3	10.152	10.152	9.933
7	11.1	3	8.748	8.748	8.748
8	33.3	3	8.593	8.593	8.593

cucumber weight
File: 1116uw Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	9.947				
0.046	9.947	0.096		1.75	k= 1, v=16
0.140	9.933	0.070		1.83	k= 2, v=16
0.410	9.933	0.070		1.86	k= 3, v=16
1.20	9.933	0.070		1.87	k= 4, v=16
3.70	**9.933**	**0.070**		**1.88**	**k= 5, v=16**
11.1	8.748	2.147	*	1.89	k= 6, v=16
33.3	8.593	2.437	*	1.89	k= 7, v=16

s = 0.654
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**7.5**	**1.2**	**49.**	**0.39**	**0.15**
EC10	18.	6.7	50.	0.21	0.37
EC25	**82.**	**18.**	**3.7E+02**	**0.31**	**0.22**
EC50	4.3E+02	14.	1.3E+04	0.71	0.033

Slope = 0.934 Std.Err. = 0.551

Goodness of fit: p = 0.37 based on DF= 5.0 16.

1116UW : cucumber weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs.	Pred.	Obs.	Pred.	%Change

US EPA ARCHIVE DOCUMENT

		Mean	Mean	-Pred.	%Control	
0.00	3.00	9.90	9.94	-0.0431	100.	0.00
0.0460	3.00	10.0	9.94	0.0609	100.	0.0103
0.140	3.00	9.90	9.93	-0.0379	99.9	0.0558
0.410	3.00	9.49	9.91	-0.426	99.8	0.237
1.20	3.00	10.2	9.85	0.341	99.2	0.846
3.70	3.00	10.2	9.67	0.479	97.3	2.67
11.1	3.00	8.75	9.26	-0.509	93.1	6.86
33.3	3.00	8.59	8.46	0.136	85.1	14.9

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

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

kale length
File: 1116kl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	32349.183	4621.312	20.105
Within (Error)	16	3677.795	229.862	
Total	23	36026.978		

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

kale length
File: 1116kl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	164.914	164.914	170.902
2	0.046	3	173.869	173.869	170.902
3	0.140	3	173.356	173.356	170.902
4	0.410	3	167.636	167.636	170.902
5	1.20	3	174.734	174.734	170.902
6	3.70	3	169.583	169.583	169.583
7	11.1	3	126.033	126.033	126.033
8	33.3	3	62.903	62.903	62.903

US EPA ARCHIVE DOCUMENT

---

kale length
File: 1116kl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	170.902				
0.046	170.902	0.484		1.75	k= 1, v=16
0.140	170.902	0.484		1.83	k= 2, v=16
0.410	170.902	0.484		1.86	k= 3, v=16
1.20	170.902	0.484		1.87	k= 4, v=16
3.70	**169.583**	**0.377**		**1.88**	**k= 5, v=16**
11.1	126.033	3.141	*	1.89	k= 6, v=16
33.3	62.903	8.241	*	1.89	k= 7, v=16

s = 15.161
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**3.9**	**2.1**	**7.4**	**0.13**	**0.53**
EC10	5.8	3.5	9.7	0.11	0.60
EC25	**11.**	**8.0**	**15.**	**0.069**	**0.72**
EC50	23.	19.	27.	0.038	0.83

Slope = 2.15 Std.Err. = 0.332

Goodness of fit: p = 0.93 based on DF= 5.0 16.

1116KL : kale length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	165.	172.	-6.76	100.	0.00
0.0460	3.00	174.	172.	2.20	100.	3.31e-07
0.140	3.00	173.	172.	1.68	100.	9.65e-05
0.410	3.00	168.	172.	-4.02	100.	0.00860
1.20	3.00	175.	171.	3.57	99.7	0.295

US EPA ARCHIVE DOCUMENT

3.70	3.00	170.	164.	5.53	95.6	4.44
11.1	3.00	126.	129.	-2.79	75.0	25.0
33.3	3.00	62.9	62.3	0.586	36.3	63.7

kale weight
File: 1116kw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	18.867	2.695	40.224
Within (Error)	16	1.079	0.067	
Total	23	19.945		

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

kale weight
File: 1116kw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	3.293	3.293	3.363
2	0.046	3	3.432	3.432	3.363
3	0.140	3	3.311	3.311	3.311
4	0.410	3	3.251	3.251	3.251
5	1.20	3	3.231	3.231	3.231
6	3.70	3	3.023	3.023	3.023
7	11.1	3	1.913	1.913	1.913
8	33.3	3	0.760	0.760	0.760

kale weight
File: 1116kw 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

US EPA ARCHIVE DOCUMENT

control	3.363				
0.046	3.363	0.327		1.75	k= 1, v=16
0.140	3.311	0.082		1.83	k= 2, v=16
0.410	3.251	0.198		1.86	k= 3, v=16
1.20	3.231	0.292		1.87	k= 4, v=16
3.70	**3.023**	**1.277**		**1.88**	**k= 5, v=16**
11.1	1.913	6.512	*	1.89	k= 6, v=16
33.3	0.760	11.951	*	1.89	k= 7, v=16

s = 0.260
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**2.3**	**1.3**	**4.0**	**0.12**	**0.56**
EC10	3.4	2.1	5.5	0.10	0.62
EC25	**6.7**	**4.8**	**9.4**	**0.070**	**0.72**
EC50	14.	12.	17.	0.042	0.82

Slope = 2.05 Std.Err. = 0.241

Goodness of fit: p = 0.98 based on DF= 5.0 16.

1116KW : kale weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	3.29	3.32	-0.0292	100.	0.00
0.0460	3.00	3.43	3.32	0.109	100.	1.59e-05
0.140	3.00	3.31	3.32	-0.0118	100.	0.00189
0.410	3.00	3.25	3.32	-0.0686	99.9	0.0780
1.20	3.00	3.23	3.28	-0.0458	98.6	1.37
3.70	3.00	3.02	2.94	0.0801	88.6	11.4
11.1	3.00	1.91	1.96	-0.0444	58.9	41.1
33.3	3.00	0.760	0.749	0.0102	22.6	77.4

onion length
File: 1116ol Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F

US EPA ARCHIVE DOCUMENT

3.70	12.292	1.027	1.87	k= 4, v=16
11.1	12.292	1.027	1.88	k= 5, v=16
33.3	12.292	1.027	1.89	k= 6, v=16
100	**12.017**	**1.454**	**1.89**	**k= 7, v=16**

---

s = 0.790
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**2.2**	**2.2E-14**	**2.2E+14**	**6.7**	**1.0E-14**
EC10	7.3E+07	1.8E-30	2.9E+45	18.	2.5E-38
EC25	**2.7E+20**	**9.8E-83**	**7.7E+122**	**49.**	**3.6E-103**
EC50	2.6E+34	3.6E-142	1.8E+210	85.	1.4E-176

Slope = 0.0483 Std.Err. = 0.123

Goodness of fit: p = 0.94 based on DF= 5.0 16.

1116NW : corn weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	13.0	13.0	1.87e-05	100.	0.00
0.140	3.00	12.5	12.4	0.167	95.6	4.44
0.410	3.00	12.2	12.4	-0.125	95.3	4.65
1.20	3.00	12.1	12.3	-0.174	95.1	4.87
3.70	3.00	12.2	12.3	-0.141	94.9	5.12
11.1	3.00	12.6	12.3	0.298	94.6	5.36
33.3	3.00	12.4	12.2	0.149	94.4	5.62
100.	3.00	12.0	12.2	-0.176	94.1	5.88

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

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

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

cotton length
File: 1116cl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F

US EPA ARCHIVE DOCUMENT

Between	7	12419.103	1774.158	3.986
Within (Error)	16	7122.115	445.132	
Total	23	19541.219		

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

onion length
File: 1116ol Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	ORIGINAL N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	147.828	147.828	149.552
2	0.046	3	151.276	151.276	149.552
3	0.140	3	142.765	142.765	142.765
4	0.410	3	133.261	133.261	133.261
5	1.20	3	129.779	129.779	129.779
6	3.70	3	129.153	129.153	129.153
7	11.1	3	94.754	94.754	94.754
8	33.3	3	84.841	84.841	84.841

onion length
File: 1116ol Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	149.552				
0.046	149.552	0.100		1.75	k= 1, v=16
0.140	142.765	0.294		1.83	k= 2, v=16
0.410	133.261	0.846		1.86	k= 3, v=16
1.20	129.779	1.048		1.87	k= 4, v=16
3.70	**129.153**	**1.084**		**1.88**	**k= 5, v=16**
11.1	94.754	3.081	*	1.89	k= 6, v=16
33.3	84.841	3.656	*	1.89	k= 7, v=16

s = 21.098
Note: df used for table values are approximate when v > 20.

US EPA ARCHIVE DOCUMENT

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**0.28**	**0.0068**	**11.**	**0.77**	**0.025**
EC10	0.88	0.051	15.	0.59	0.058
EC25	**6.2**	**1.3**	**28.**	**0.32**	**0.22**
EC50	54.	17.	1.7E+02	0.24	0.32

Slope = 0.718 Std.Err. = 0.269

Goodness of fit: p = 0.90 based on DF= 5.0 16.

1116OL : onion length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	148.	149.	-0.836	100.	0.00
0.0460	3.00	151.	147.	4.66	98.6	1.38
0.140	3.00	143.	144.	-1.18	96.8	3.17
0.410	3.00	133.	139.	-5.86	93.6	6.42
1.20	3.00	130.	131.	-1.36	88.2	11.8
3.70	3.00	129.	119.	10.5	79.8	20.2
11.1	3.00	94.8	102.	-7.62	68.9	31.1
33.3	3.00	84.8	83.2	1.68	55.9	44.1

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

onion weight

File: 1116ow Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	0.074	0.011	5.500
Within (Error)	16	0.027	0.002	
Total	23	0.101		

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

US EPA ARCHIVE DOCUMENT

onion weight
File: 1116ow Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	0.228	0.228	0.228
2	0.046	3	0.211	0.211	0.223
3	0.140	3	0.235	0.235	0.223
4	0.410	3	0.197	0.197	0.197
5	1.20	3	0.155	0.155	0.155
6	3.70	3	0.154	0.154	0.154
7	11.1	3	0.094	0.094	0.094
8	33.3	3	0.078	0.078	0.078

onion weight
File: 1116ow Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	0.228				
0.046	0.223	0.155		1.75	k= 1, v=16
0.140	0.223	0.155		1.83	k= 2, v=16
0.410	**0.197**	**0.942**		**1.86**	**k= 3, v=16**
1.20	0.155	2.214	*	1.87	k= 4, v=16
3.70	0.154	2.224	*	1.88	k= 5, v=16
11.1	0.094	4.028	*	1.89	k= 6, v=16
33.3	0.078	4.529	*	1.89	k= 7, v=16

s = 0.041
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**0.066**	**0.0022**	**2.0**	**0.71**	**0.033**
EC10	0.19	0.011	3.2	0.59	0.059
EC25	**1.1**	**0.17**	**7.5**	**0.40**	**0.15**
EC50	8.1	2.9	23.	0.22	0.35

US EPA ARCHIVE DOCUMENT

Slope = 0.786 Std.Err. = 0.216

Goodness of fit: p = 0.80 based on DF= 5.0 16.

1116OW : onion weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	0.228	0.231	-0.00302	100.	0.00
0.0460	3.00	0.211	0.222	-0.0111	96.1	3.86
0.140	3.00	0.235	0.212	0.0228	91.7	8.27
0.410	3.00	0.197	0.196	0.00122	84.6	15.4
1.20	3.00	0.155	0.172	-0.0173	74.3	25.7
3.70	3.00	0.154	0.140	0.0141	60.6	39.4
11.1	3.00	0.0943	0.106	-0.0116	45.8	54.2
33.3	3.00	0.0777	0.0729	0.00475	31.5	68.5

ryegrass length

File: 1116rl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	20557.625	2936.804	1.323
Within (Error)	16	35505.908	2219.119	
Total	23	56063.532		

Critical F value = 2.66 (0.05,7,16)

Since F < Critical F FAIL TO REJECT Ho:All groups equal

ryegrass length

File: 1116rl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	ORIGINAL N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	296.905	296.905	296.905

US EPA ARCHIVE DOCUMENT

2	0.046	3	263.195	263.195	292.527
3	0.140	3	291.852	291.852	292.527
4	0.410	3	322.534	322.534	292.527
5	1.20	3	269.327	269.327	289.784
6	3.70	3	303.867	303.867	289.784
7	11.1	3	296.158	296.158	289.784
8	33.3	3	221.111	221.111	221.111

ryegrass length
File: 1116rl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	296.905				
0.046	292.527	0.114		1.75	k= 1, v=16
0.140	292.527	0.114		1.83	k= 2, v=16
0.410	292.527	0.114		1.86	k= 3, v=16
1.20	289.784	0.185		1.87	k= 4, v=16
3.70	289.784	0.185		1.88	k= 5, v=16
11.1	**289.784**	**0.185**		**1.89**	**k= 6, v=16**
33.3	221.111	1.971	*	1.89	k= 7, v=16

s = 47.108
Note: df used for table values are approximate when v > 20.

EC_x

!!!Failure#1: near-singular matrix, model possibly unsuitable.

ryegrass weight
File: 1116rw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	0.526	0.075	1.339
Within (Error)	16	0.901	0.056	
Total	23	1.427		

Critical F value = 2.66 (0.05,7,16)

US EPA ARCHIVE DOCUMENT

Since F < Critical F FAIL TO REJECT Ho:All groups equal

ryegrass weight
File: 1116rw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	0.576	0.576	0.685
2	0.046	3	0.551	0.551	0.685
3	0.140	3	0.695	0.695	0.685
4	0.410	3	0.918	0.918	0.685
5	1.20	3	0.499	0.499	0.671
6	3.70	3	0.813	0.813	0.671
7	11.1	3	0.702	0.702	0.671
8	33.3	3	0.465	0.465	0.465

ryegrass weight
File: 1116rw 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	0.685				
0.046	0.685	0.565		1.75	k= 1, v=16
0.140	0.685	0.565		1.83	k= 2, v=16
0.410	0.685	0.565		1.86	k= 3, v=16
1.20	0.671	0.493		1.87	k= 4, v=16
3.70	0.671	0.493		1.88	k= 5, v=16
11.1	0.671	0.493		1.89	k= 6, v=16
33.3	**0.465**	**0.571**		**1.89**	**k= 7, v=16**

s = 0.237
Note: df used for table values are approximate when v > 20.

EC_x

!!!Failure#1: near-singular matrix, model possibly unsuitable.

US EPA ARCHIVE DOCUMENT

soybean length
File: 1116sl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	5461.926	780.275	0.279
Within (Error)	16	44827.184	2801.699	
Total	23	50289.110		

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

soybean length
File: 1116sl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	265.386	265.386	265.386
2	0.046	3	257.631	257.631	257.631
3	0.140	3	240.305	240.305	257.354
4	0.410	3	253.222	253.222	257.354
5	1.20	3	264.980	264.980	257.354
6	3.70	3	270.907	270.907	257.354
7	11.1	3	221.056	221.056	236.717
8	33.3	3	252.378	252.378	236.717

soybean length
File: 1116sl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

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

US EPA ARCHIVE DOCUMENT

control	265.386			
0.046	257.631	0.179	1.75	k= 1, v=16
0.140	257.354	0.186	1.83	k= 2, v=16
0.410	257.354	0.186	1.86	k= 3, v=16
1.20	257.354	0.186	1.87	k= 4, v=16
3.70	257.354	0.186	1.88	k= 5, v=16
11.1	236.717	0.663	1.89	k= 6, v=16
33.3	**236.717**	**0.663**	**1.89**	**k= 7, v=16**

---

s = 52.931
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**1.5**	**9.6E-19**	**2.4E+18**	**8.8**	**6.4E-19**
EC10	1.2E+03	5.8E-18	2.4E+23	9.8	5.0E-21
EC25	**7.9E+07**	**2.1E-46**	**3.0E+61**	**26.**	**2.7E-54**
EC50	1.8E+13	2.3E-82	1.5E+108	46.	1.2E-95

Slope = 0.126 Std.Err. = 0.477

Goodness of fit: p = 0.88 based on DF= 5.0 16.

1116SL : soybean length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	265.	265.	0.550	100.	0.00
0.0460	3.00	258.	256.	1.59	96.7	3.32
0.140	3.00	240.	255.	-14.5	96.2	3.80
0.410	3.00	253.	253.	-0.208	95.7	4.31
1.20	3.00	265.	252.	13.0	95.1	4.87
3.70	3.00	271.	250.	20.7	94.5	5.52
11.1	3.00	221.	248.	-27.3	93.8	6.23
33.3	3.00	252.	246.	6.07	93.0	7.00

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

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

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

soybean weight
File: 1116sw Transform: NO TRANSFORMATION

ANOVA TABLE

US EPA ARCHIVE DOCUMENT

SOURCE	DF	SS	MS	F
Between	7	4.429	0.633	2.380
Within (Error)	16	4.257	0.266	
Total	23	8.686		

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

soybean weight
File: 1116sw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	5.149	5.149	5.292
2	0.046	3	5.434	5.434	5.292
3	0.140	3	5.264	5.264	5.264
4	0.410	3	4.923	4.923	5.076
5	1.20	3	5.105	5.105	5.076
6	3.70	3	5.200	5.200	5.076
7	11.1	3	3.953	3.953	4.368
8	33.3	3	4.783	4.783	4.368

soybean weight
File: 1116sw 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	5.292				
0.046	5.292	0.339		1.75	k= 1, v=16
0.140	5.264	0.273		1.83	k= 2, v=16
0.410	5.076	0.172		1.86	k= 3, v=16
1.20	5.076	0.172		1.87	k= 4, v=16
3.70	5.076	0.172		1.88	k= 5, v=16
11.1	4.368	1.854		1.89	k= 6, v=16
33.3	**4.368**	**1.854**		**1.89**	**k= 7, v=16**

US EPA ARCHIVE DOCUMENT

---

s = 0.516
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**0.85**	**0.00038**	**1.9E+03**	**1.6**	**0.00045**
EC10	6.6	0.073	6.0E+02	0.94	0.011
EC25	**2.0E+02**	**2.7**	**1.5E+04**	**0.90**	**0.013**
EC50	9.1E+03	0.25	3.3E+08	2.2	2.7E-05

Slope = 0.409 Std.Err. = 0.363

Goodness of fit: p = 0.12 based on DF= 5.0 16.

1116SW : soybean weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	5.15	5.31	-0.157	100.	0.00
0.0460	3.00	5.43	5.22	0.210	98.5	1.53
0.140	3.00	5.26	5.17	0.0888	97.5	2.47
0.410	3.00	4.92	5.10	-0.181	96.2	3.79
1.20	3.00	5.11	5.01	0.0995	94.3	5.65
3.70	3.00	5.20	4.86	0.335	91.7	8.31
11.1	3.00	3.95	4.68	-0.732	88.3	11.7
33.3	3.00	4.78	4.46	0.326	84.0	16.0

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

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

sugarbeet length
File: 1116bl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	31636.640	4519.520	14.403
Within (Error)	16	5020.676	313.792	

US EPA ARCHIVE DOCUMENT

Total 23 36657.316

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

sugarbeet length
File: 1116bl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	195.111	195.111	195.111
2	0.015	3	186.872	186.872	189.609
3	0.046	3	189.274	189.274	189.609
4	0.14	3	192.682	192.682	189.609
5	0.41	3	180.268	180.268	180.268
6	1.2	3	178.785	178.785	178.785
7	3.7	3	165.743	165.743	165.743
8	11.1	3	77.542	77.542	77.542

sugarbeet length
File: 1116bl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	195.111				
0.015	189.609	0.380		1.75	k= 1, v=16
0.046	189.609	0.380		1.83	k= 2, v=16
0.14	189.609	0.380		1.86	k= 3, v=16
0.41	180.268	1.026		1.87	k= 4, v=16
1.2	**178.785**	**1.129**		**1.88**	**k= 5, v=16**
3.7	165.743	2.031	*	1.89	k= 6, v=16
11.1	77.542	8.129	*	1.89	k= 7, v=16

s = 17.714
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter Estimate 95% Bounds Std.Err. Lower Bound

US EPA ARCHIVE DOCUMENT

		Lower	Upper		/Estimate
EC5	**2.5**	**1.2**	**5.3**	**0.15**	**0.48**
EC10	3.4	1.9	6.1	0.12	0.56
EC25	**5.5**	**3.8**	**7.9**	**0.076**	**0.70**
EC50	9.3	7.8	11.	0.039	0.83

Slope = 2.90 Std.Err. = 0.708

Goodness of fit: p = 0.95 based on DF= 5.0 16.

1116BL : sugarbeet length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	195.	187.	7.65	100.	0.00
0.0150	3.00	187.	187.	-0.590	100.	1.52e-14
0.0460	3.00	189.	187.	1.81	100.	1.02e-09
0.140	3.00	193.	187.	5.22	100.	5.83e-06
0.410	3.00	180.	187.	-7.19	100.	0.00401
1.20	3.00	179.	187.	-7.78	99.5	0.481
3.70	3.00	166.	165.	0.998	87.9	12.1
11.1	3.00	77.5	77.7	-0.126	41.4	58.6

sugarbeet weight
File: 1116bw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	37.338	5.334	12.853
Within (Error)	16	6.638	0.415	
Total	23	43.977		

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

sugarbeet weight
File: 1116bw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

US EPA ARCHIVE DOCUMENT

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	5.519	5.519	5.519
2	0.015	3	5.372	5.372	5.487
3	0.046	3	5.602	5.602	5.487
4	0.14	3	5.372	5.372	5.372
5	0.41	3	4.905	4.905	4.905
6	1.2	3	4.735	4.735	4.735
7	3.7	3	3.941	3.941	3.941
8	11.1	3	1.622	1.622	1.622

sugarbeet weight
File: 1116bw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	5.519				
0.015	5.487	0.060		1.75	k= 1, v=16
0.046	5.487	0.060		1.83	k= 2, v=16
0.14	5.372	0.279		1.86	k= 3, v=16
0.41	4.905	1.167		1.87	k= 4, v=16
1.2	**4.735**	**1.491**		**1.88**	**k= 5, v=16**
3.7	3.941	3.000	*	1.89	k= 6, v=16
11.1	1.622	7.409	*	1.89	k= 7, v=16

s = 0.644
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**1.1**	**0.50**	**2.6**	**0.17**	**0.44**
EC10	1.7	0.85	3.3	0.14	0.51
EC25	**3.2**	**2.1**	**5.0**	**0.094**	**0.64**
EC50	6.6	5.1	8.5	0.053	0.78

Slope = 2.16 Std.Err. = 0.414

Goodness of fit: p = 0.78 based on DF= 5.0 16.

US EPA ARCHIVE DOCUMENT

1116BW : sugarbeet weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	5.52	5.33	0.192	100.	0.00
0.0150	3.00	5.37	5.33	0.0457	100.	5.46e-07
0.0460	3.00	5.60	5.33	0.276	100.	0.000156
0.140	3.00	5.37	5.33	0.0462	100.	0.0149
0.410	3.00	4.91	5.30	-0.397	99.5	0.455
1.20	3.00	4.73	5.03	-0.300	94.5	5.48
3.70	3.00	3.94	3.76	0.179	70.6	29.4
11.1	3.00	1.62	1.66	-0.0413	31.2	68.8

tomato length
File: 1116tl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	17194.479	2456.354	6.346
Within (Error)	16	6193.239	387.077	
Total	23	23387.717		

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

tomato length
File: 1116tl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	194.094	194.094	194.094
2	0.046	3	177.886	177.886	180.292
3	0.140	3	182.697	182.697	180.292

US EPA ARCHIVE DOCUMENT

4	0.410	3	178.251	178.251	178.251
5	1.20	3	165.882	165.882	177.052
6	3.70	3	188.222	188.222	177.052
7	11.1	3	148.961	148.961	148.961
8	33.3	3	105.900	105.900	105.900

tomato length
File: 1116tl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	194.094				
0.046	180.292	0.859		1.75	k= 1, v=16
0.140	180.292	0.859		1.83	k= 2, v=16
0.410	178.251	0.986		1.86	k= 3, v=16
1.20	177.052	1.061		1.87	k= 4, v=16
3.70	**177.052**	**1.061**		**1.88**	**k= 5, v=16**
11.1	148.961	2.810	*	1.89	k= 6, v=16
33.3	105.900	5.490	*	1.89	k= 7, v=16

s = 19.674
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**4.9**	**1.4**	**17.**	**0.26**	**0.29**
EC10	7.9	3.1	20.	0.19	0.40
EC25	**18.**	**11.**	**28.**	**0.099**	**0.62**
EC50	43.	28.	67.	0.093	0.64

Slope = 1.73 Std.Err. = 0.557

Goodness of fit: p = 0.55 based on DF= 5.0 16.

1116TL : tomato length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	194.	182.	12.5	100.	0.00

US EPA ARCHIVE DOCUMENT

0.0460	3.00	178.	182.	-3.70	100.	1.28e-05
0.140	3.00	183.	182.	1.11	100.	0.000794
0.410	3.00	178.	182.	-3.30	100.	0.0226
1.20	3.00	166.	181.	-15.1	99.7	0.348
3.70	3.00	188.	176.	12.5	96.8	3.21
11.1	3.00	149.	154.	-4.88	84.7	15.3
33.3	3.00	106.	105.	0.881	57.8	42.2

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

tomato weight
File: 1116tw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	17.480	2.497	9.716
Within (Error)	16	4.114	0.257	
Total	23	21.594		

Critical F value = 2.66 (0.05,7,16)
Since F > Critical F REJECT Ho:All groups equal

tomato weight
File: 1116tw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	4.186	4.186	4.186
2	0.046	3	3.932	3.932	4.145
3	0.140	3	4.337	4.337	4.145
4	0.410	3	4.166	4.166	4.145
5	1.20	3	3.731	3.731	4.129
6	3.70	3	4.526	4.526	4.129
7	11.1	3	2.767	2.767	2.767
8	33.3	3	1.867	1.867	1.867

tomato weight

US EPA ARCHIVE DOCUMENT

File: 1116tw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	4.186				
0.046	4.145	0.098		1.75	k= 1, v=16
0.140	4.145	0.098		1.83	k= 2, v=16
0.410	4.145	0.098		1.86	k= 3, v=16
1.20	4.129	0.137		1.87	k= 4, v=16
3.70	**4.129**	**0.137**		**1.88**	**k= 5, v=16**
11.1	2.767	3.427	*	1.89	k= 6, v=16
33.3	1.867	5.600	*	1.89	k= 7, v=16

s = 0.507

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

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**3.2**	**0.92**	**11.**	**0.26**	**0.29**
EC10	5.1	1.9	14.	0.21	0.37
EC25	**11.**	**6.1**	**20.**	**0.12**	**0.55**
EC50	27.	19.	38.	0.072	0.71

Slope = 1.78 Std.Err. = 0.480

Goodness of fit: p = 0.19 based on DF= 5.0 16.

1116TW : tomato weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	4.19	4.15	0.0339	100.	0.00
0.0460	3.00	3.93	4.15	-0.220	100.	4.66e-05
0.140	3.00	4.34	4.15	0.186	100.	0.00259
0.410	3.00	4.17	4.15	0.0165	99.9	0.0645
1.20	3.00	3.73	4.12	-0.385	99.2	0.843
3.70	3.00	4.53	3.89	0.641	93.6	6.41
11.1	3.00	2.77	3.11	-0.347	75.0	25.0
33.3	3.00	1.87	1.79	0.0764	43.1	56.9

wheat length

File: 1116wl Transform: NO TRANSFORMATION

US EPA ARCHIVE DOCUMENT

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	3097.617	442.517	1.696
Within (Error)	16	4174.255	260.891	
Total	23	7271.872		

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

wheat length
File: 1116wl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	332.945	332.945	337.127
2	0.140	3	341.308	341.308	337.127
3	0.410	3	335.118	335.118	335.118
4	1.20	3	321.578	321.578	332.390
5	3.70	3	334.187	334.187	332.390
6	11.1	3	341.406	341.406	332.390
7	33.3	3	315.277	315.277	315.277
8	100	3	308.899	308.899	308.899

wheat length
File: 1116wl 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	337.127				
0.140	337.127	0.317		1.75	k= 1, v=16
0.410	335.118	0.165		1.83	k= 2, v=16
1.20	332.390	0.042		1.86	k= 3, v=16
3.70	332.390	0.042		1.87	k= 4, v=16

US EPA ARCHIVE DOCUMENT

11.1	332.390	0.042	1.88	k= 5, v=16
33.3	315.277	1.340	1.89	k= 6, v=16
100	**308.899**	**1.823**	**1.89**	**k= 7, v=16**

s = 16.152
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**53.**	**13.**	**2.1E+02**	**0.29**	**0.25**
EC10	1.3E+02	40.	4.5E+02	0.25	0.30
EC25	**6.4E+02**	**20.**	**2.0E+04**	**0.72**	**0.032**
EC50	3.6E+03	6.6	2.0E+06	1.3	0.0018

Slope = 0.895 Std.Err. = 0.728

Goodness of fit: p = 0.52 based on DF= 5.0 16.

1116WL : wheat length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	333.	334.	-1.42	100.	0.00
0.140	3.00	341.	334.	6.96	100.	0.00389
0.410	3.00	335.	334.	0.823	100.	0.0205
1.20	3.00	322.	334.	-12.5	99.9	0.0915
3.70	3.00	334.	333.	1.06	99.6	0.369
11.1	3.00	341.	330.	11.1	98.8	1.22
33.3	3.00	315.	323.	-7.71	96.6	3.40
100.	3.00	309.	307.	1.66	91.9	8.11

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

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

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

wheat weight
File: 1116ww Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F

US EPA ARCHIVE DOCUMENT

Between	7	0.282	0.040	1.481
Within (Error)	16	0.439	0.027	
Total	23	0.722		

Critical F value = 2.66 (0.05,7,16)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

wheat weight
File: 1116ww Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	1.132	1.132	1.139
2	0.140	3	1.069	1.069	1.139
3	0.410	3	1.217	1.217	1.139
4	1.20	3	1.010	1.010	1.121
5	3.70	3	1.100	1.100	1.121
6	11.1	3	1.254	1.254	1.121
7	33.3	3	1.062	1.062	1.062
8	100	3	0.885	0.885	0.885

wheat weight
File: 1116ww 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	1.139				
0.140	1.139	0.054		1.75	k= 1, v=16
0.410	1.139	0.054		1.83	k= 2, v=16
1.20	1.121	0.077		1.86	k= 3, v=16
3.70	1.121	0.077		1.87	k= 4, v=16
11.1	1.121	0.077		1.88	k= 5, v=16
33.3	1.062	0.512		1.89	k= 6, v=16
100	**0.885**	**1.821**		**1.89**	**k= 7, v=16**

s = 0.166
Note: df used for table values are approximate when v > 20.

US EPA ARCHIVE DOCUMENT

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**39.**	**4.1**	**3.8E+02**	**0.47**	**0.10**
EC10	58.	15.	2.3E+02	0.29	0.25
EC25	**1.1E+02**	**55.**	**2.3E+02**	**0.15**	**0.49**
EC50	2.3E+02	27.	2.1E+03	0.45	0.11

Slope = 2.12 Std.Err. = 2.43

Goodness of fit: p = 0.52 based on DF= 5.0 16.

1116WW : wheat weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	1.13	1.13	0.00461	100.	0.00
0.140	3.00	1.07	1.13	-0.0584	100.	4.16e-10
0.410	3.00	1.22	1.13	0.0896	100.	2.55e-07
1.20	3.00	1.01	1.13	-0.117	100.	6.02e-05
3.70	3.00	1.10	1.13	-0.0273	100.	0.00672
11.1	3.00	1.25	1.12	0.129	99.7	0.250
33.3	3.00	1.06	1.09	-0.0238	96.4	3.63
100.	3.00	0.885	0.883	0.00260	78.3	21.7

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

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

VEGETATIVE VIGOR TEST

corn length
File: 1116vnl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	24290.310	3470.044	1.476
Within (Error)	40	94049.711	2351.243	

US EPA ARCHIVE DOCUMENT

Total 47 118340.021

Critical F value = 2.25 (0.05,7,40)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

corn length
File: 1116vnl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	890.722	890.722	899.411
2	0.140	6	877.417	877.417	899.411
3	0.410	6	908.555	908.555	899.411
4	1.2	6	910.639	910.639	899.411
5	3.7	6	909.722	909.722	899.411
6	11.1	6	871.028	871.028	876.125
7	33.3	6	881.222	881.222	876.125
8	100	6	840.972	840.972	840.972

corn length
File: 1116vnl 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	899.411				
0.140	899.411	0.310		1.68	k= 1, v=40
0.410	899.411	0.310		1.76	k= 2, v=40
1.2	899.411	0.310		1.79	k= 3, v=40
3.7	899.411	0.310		1.80	k= 4, v=40
11.1	876.125	0.521		1.80	k= 5, v=40
33.3	876.125	0.521		1.81	k= 6, v=40
100	**840.972**	**1.777**		**1.81**	**k= 7, v=40**

s = 48.490
Note: df used for table values are approximate when v > 20.

Estimates of EC%

US EPA ARCHIVE DOCUMENT

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**75.**	**27.**	**2.1E+02**	**0.22**	**0.36**
EC10	2.0E+02	40.	9.7E+02	0.34	0.20
EC25	**9.7E+02**	**16.**	**5.8E+04**	**0.88**	**0.017**
EC50	5.7E+03	5.1	6.5E+06	1.5	0.00088

Slope = 0.874 Std.Err. = 0.733

Goodness of fit: p = 0.64 based on DF= 5.0 40.

1116VNL : corn length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	891.	897.	-6.75	100.	0.00
0.140	6.00	877.	897.	-20.0	100.	0.00276
0.410	6.00	909.	897.	11.2	100.	0.0145
1.20	6.00	911.	897.	13.7	99.9	0.0649
3.70	6.00	910.	895.	14.6	99.7	0.264
11.1	6.00	871.	890.	-18.5	99.1	0.885
33.3	6.00	881.	875.	6.46	97.5	2.53
100.	6.00	841.	842.	-0.759	93.8	6.21

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

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

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

corn weight

File: 1116vnw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	1301.487	185.927	2.626
Within (Error)	40	2831.886	70.797	
Total	47	4133.373		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

US EPA ARCHIVE DOCUMENT

corn weight
File: 1116vnw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	105.303	105.303	105.303
2	0.140	6	101.295	101.295	104.603
3	0.410	6	105.045	105.045	104.603
4	1.2	6	105.690	105.690	104.603
5	3.7	6	106.383	106.383	104.603
6	11.1	6	103.702	103.702	103.702
7	33.3	6	100.757	100.757	100.757
8	100	6	89.380	89.380	89.380

corn weight
File: 1116vnw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	105.303				
0.140	104.603	0.144		1.68	k= 1, v=40
0.410	104.603	0.144		1.76	k= 2, v=40
1.2	104.603	0.144		1.79	k= 3, v=40
3.7	104.603	0.144		1.80	k= 4, v=40
11.1	103.702	0.330		1.80	k= 5, v=40
33.3	**100.757**	**0.936**		**1.81**	**k= 6, v=40**
100	89.380	3.278	*	1.81	k= 7, v=40

s = 8.414
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**41.**	**15.**	**1.1E+02**	**0.22**	**0.36**
EC10	71.	42.	1.2E+02	0.11	0.59
EC25	**1.8E+02**	**79.**	**4.0E+02**	**0.17**	**0.45**
EC50	4.9E+02	75.	3.2E+03	0.40	0.15

US EPA ARCHIVE DOCUMENT

Slope = 1.52 Std.Err. = 0.845

Goodness of fit: p = 0.93 based on DF= 5.0 40.

1116VNW : corn weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	105.	105.	0.614	100.	0.00
0.140	6.00	101.	105.	-3.39	100.	3.38e-06
0.410	6.00	105.	105.	0.356	100.	0.000139
1.20	6.00	106.	105.	1.00	100.	0.00349
3.70	6.00	106.	105.	1.76	99.9	0.0614
11.1	6.00	104.	104.	-0.348	99.4	0.611
33.3	6.00	101.	101.	0.00190	96.2	3.76
100.	6.00	89.4	89.4	0.00729	85.4	14.6

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

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

cotton length
File: 1116vcl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	25831.509	3690.216	19.422
Within (Error)	40	7600.023	190.001	
Total	47	33431.532		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

cotton length
File: 1116vcl Transform: NO TRANSFORMATION

US EPA ARCHIVE DOCUMENT

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	228.806	228.806	228.806
2	0.140	6	226.417	226.417	228.074
3	0.410	6	225.806	225.806	228.074
4	1.2	6	232.000	232.000	228.074
5	3.7	6	226.500	226.500	226.500
6	11.1	6	213.528	213.528	213.528
7	33.3	6	198.361	198.361	198.361
8	100	6	158.611	158.611	158.611

cotton length
File: 1116vcl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	228.806				
0.140	228.074	0.092		1.68	k= 1, v=40
0.410	228.074	0.092		1.76	k= 2, v=40
1.2	228.074	0.092		1.79	k= 3, v=40
3.7	**226.500**	**0.290**		**1.80**	**k= 4, v=40**
11.1	213.528	1.920	*	1.80	k= 5, v=40
33.3	198.361	3.826	*	1.81	k= 6, v=40
100	158.611	8.820	*	1.81	k= 7, v=40

s = 13.784
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**11.**	**5.4**	**23.**	**0.16**	**0.48**
EC10	23.	14.	38.	0.11	0.60
EC25	**73.**	**58.**	**93.**	**0.051**	**0.79**
EC50	2.7E+02	1.7E+02	4.3E+02	0.10	0.63

Slope = 1.19 Std.Err. = 0.204

Goodness of fit: p = 0.93 based on DF= 5.0 40.

US EPA ARCHIVE DOCUMENT

1116VCL : cotton length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	229.	228.	0.547	100.	0.00
0.140	6.00	226.	228.	-1.83	100.	0.00458
0.410	6.00	226.	228.	-2.36	100.	0.0395
1.20	6.00	232.	228.	4.32	99.7	0.255
3.70	6.00	227.	225.	1.26	98.7	1.32
11.1	6.00	214.	217.	-3.46	95.1	4.94
33.3	6.00	198.	196.	1.92	86.1	13.9
100.	6.00	159.	159.	-0.392	69.7	30.3

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

cotton weight
File: 1116vcw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	318.397	45.485	5.302
Within (Error)	40	343.177	8.579	
Total	47	661.574		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

cotton weight
File: 1116vcw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	33.860	33.860	33.872
2	0.140	6	33.884	33.884	33.872
3	0.410	6	32.394	32.394	33.277

US EPA ARCHIVE DOCUMENT

4	1.2	6	33.969	33.969	33.277
5	3.7	6	33.183	33.183	33.277
6	11.1	6	33.563	33.563	33.277
7	33.3	6	31.951	31.951	31.951
8	100	6	25.755	25.755	25.755

cotton weight
File: 1116vcw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	33.872				
0.140	33.872	0.007		1.68	k= 1, v=40
0.410	33.277	0.345		1.76	k= 2, v=40
1.2	33.277	0.345		1.79	k= 3, v=40
3.7	33.277	0.345		1.80	k= 4, v=40
11.1	33.277	0.345		1.80	k= 5, v=40
33.3	**31.951**	**1.129**		**1.81**	**k= 6, v=40**
100	25.755	4.793	*	1.81	k= 7, v=40

s = 2.929
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**35.**	**15.**	**83.**	**0.19**	**0.42**
EC10	54.	31.	92.	0.12	0.58
EC25	**1.1E+02**	**83.**	**1.4E+02**	**0.056**	**0.77**
EC50	2.3E+02	1.1E+02	4.9E+02	0.16	0.47

Slope = 2.02 Std.Err. = 0.819

Goodness of fit: p = 0.94 based on DF= 5.0 40.

1116VCW : cotton weight

Observed vs. Predicted Treatment Group Means

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

US EPA ARCHIVE DOCUMENT

0.00	6.00	33.9	33.5	0.368	100.	0.00
0.140	6.00	33.9	33.5	0.392	100.	4.29e-09
0.410	6.00	32.4	33.5	-1.10	100.	1.44e-06
1.20	6.00	34.0	33.5	0.477	100.	0.000203
3.70	6.00	33.2	33.5	-0.304	100.	0.0146
11.1	6.00	33.6	33.4	0.202	99.6	0.390
33.3	6.00	32.0	32.0	-0.0426	95.5	4.47
100.	6.00	25.8	25.8	0.00510	76.9	23.1

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

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

cucumber length
File: 1116vul Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	330561.622	47223.089	17.285
Within (Error)	40	109277.952	2731.949	
Total	47	439839.574		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

cucumber length
File: 1116vul Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	459.306	459.306	492.968
2	0.140	6	463.834	463.834	492.968
3	0.410	6	509.528	509.528	492.968
4	1.2	6	534.667	534.667	492.968
5	3.7	6	475.778	475.778	492.968
6	11.1	6	514.694	514.694	492.968
7	33.3	6	463.139	463.139	463.139
8	100	6	250.695	250.695	250.695

US EPA ARCHIVE DOCUMENT

cucumber length
File: 1116vul Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	492.968				
0.140	492.968	1.115		1.68	k= 1, v=40
0.410	492.968	1.115		1.76	k= 2, v=40
1.2	492.968	1.115		1.79	k= 3, v=40
3.7	492.968	1.115		1.80	k= 4, v=40
11.1	492.968	1.115		1.80	k= 5, v=40
33.3	**463.139**	**0.127**		**1.81**	**k= 6, v=40**
100	250.695	6.913	*	1.81	k= 7, v=40

s = 52.268
Note: df used for table values are approximate when v > 20.
Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**32.**	**17.**	**60.**	**0.14**	**0.52**
EC10	41.	25.	68.	0.11	0.60
EC25	**63.**	**48.**	**83.**	**0.060**	**0.76**
EC50	1.0E+02	89.	1.2E+02	0.028	0.88

Slope = 3.24 Std.Err. = 0.900

Goodness of fit: p = 0.12 based on DF= 5.0 40.

1116VUL : cucumber length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	459.	493.	-33.6	100.	0.00
0.140	6.00	464.	493.	-29.0	100.	2.31e-14
0.410	6.00	510.	493.	16.6	100.	4.38e-13
1.20	6.00	535.	493.	41.8	100.	2.09e-08
3.70	6.00	476.	493.	-17.1	100.	0.000157
11.1	6.00	515.	492.	22.3	99.9	0.0918
33.3	6.00	463.	464.	-1.00	94.2	5.83
100.	6.00	251.	251.	0.0810	50.8	49.2

US EPA ARCHIVE DOCUMENT

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

cucumber weight
File: 1116vuw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	32577.501	4653.929	15.764
Within (Error)	40	11809.126	295.228	
Total	47	44386.627		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

cucumber weight
File: 1116vuw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	130.850	130.850	138.548
2	0.140	6	134.848	134.848	138.548
3	0.410	6	141.555	141.555	138.548
4	1.2	6	146.938	146.938	138.548
5	3.7	6	129.963	129.963	133.315
6	11.1	6	136.667	136.667	133.315
7	33.3	6	118.752	118.752	118.752
8	100	6	59.095	59.095	59.095

cucumber weight
File: 1116vuw 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

US EPA ARCHIVE DOCUMENT

control	138.548				
0.140	138.548	0.776		1.68	k= 1, v=40
0.410	138.548	0.776		1.76	k= 2, v=40
1.2	138.548	0.776		1.79	k= 3, v=40
3.7	133.315	0.248		1.80	k= 4, v=40
11.1	133.315	0.248		1.80	k= 5, v=40
33.3	**118.752**	**1.220**		**1.81**	**k= 6, v=40**
100	59.095	7.233	*	1.81	k= 7, v=40

---

s = 17.182
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**21.**	**11.**	**42.**	**0.15**	**0.51**
EC10	29.	17.	50.	0.12	0.58
EC25	**49.**	**35.**	**67.**	**0.071**	**0.72**
EC50	86.	73.	1.0E+02	0.037	0.84

Slope = 2.70 Std.Err. = 0.601

Goodness of fit: p = 0.69 based on DF= 5.0 40.

1116VUW : cucumber weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	131.	137.	-6.13	100.	0.00
0.140	6.00	135.	137.	-2.13	100.	2.57e-12
0.410	6.00	142.	137.	4.58	100.	1.81e-08
1.20	6.00	147.	137.	9.96	100.	2.71e-05
3.70	6.00	130.	137.	-7.00	100.	0.0112
11.1	6.00	137.	136.	0.804	99.2	0.812
33.3	6.00	119.	119.	-0.108	86.8	13.2
100.	6.00	59.1	59.1	0.0126	43.1	56.9

kale length
File: 1116vkl Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F

US EPA ARCHIVE DOCUMENT

Between	7	15823.935	2260.562	5.054
Within (Error)	40	17892.588	447.315	
Total	47	33716.523		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

kale length
File: 1116vkl Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	196.333	196.333	202.319
2	0.015	6	208.306	208.306	202.319
3	0.046	6	197.167	197.167	200.463
4	0.140	6	197.444	197.444	200.463
5	0.410	6	206.778	206.778	200.463
6	1.2	6	197.500	197.500	197.500
7	3.7	6	188.306	188.306	188.306
8	11.1	6	146.889	146.889	146.889

kale length
File: 1116vkl Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	202.319				
0.015	202.319	0.490		1.68	k= 1, v=40
0.046	200.463	0.338		1.76	k= 2, v=40
0.140	200.463	0.338		1.79	k= 3, v=40
0.410	200.463	0.338		1.80	k= 4, v=40
1.2	197.500	0.096		1.80	k= 5, v=40
3.7	**188.306**	**0.657**		**1.81**	**k= 6, v=40**
11.1	146.889	4.049	*	1.81	k= 7, v=40

s = 21.150
Note: df used for table values are approximate when v > 20.

US EPA ARCHIVE DOCUMENT

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**3.2**	**1.2**	**8.3**	**0.21**	**0.38**
EC10	4.9	2.6	9.4	0.14	0.52
EC25	**10.**	**7.8**	**14.**	**0.060**	**0.76**
EC50	24.	12.	47.	0.15	0.50

Slope = 1.89 Std.Err. = 0.726

Goodness of fit: p = 0.86 based on DF= 5.0 40.

1116VKL : kale length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	196.	201.	-4.57	100.	0.00
0.0150	6.00	208.	201.	7.40	100.	8.23e-08
0.0460	6.00	197.	201.	-3.74	100.	1.60e-05
0.140	6.00	197.	201.	-3.46	100.	0.00134
0.410	6.00	207.	201.	5.96	100.	0.0451
1.20	6.00	198.	199.	-1.93	99.3	0.735
3.70	6.00	188.	188.	0.385	93.5	6.46
11.1	6.00	147.	147.	-0.0484	73.1	26.9

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

kale weight

File: 1116ukw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	1184.308	169.187	3.674
Within (Error)	40	1842.105	46.053	
Total	47	3026.413		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

kale weight

US EPA ARCHIVE DOCUMENT

File: 1116ukw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	39.649	39.649	41.416
2	0.015	6	42.883	42.883	41.416
3	0.046	6	39.975	39.975	41.416
4	0.140	6	39.903	39.903	41.416
5	0.410	6	44.483	44.483	41.416
6	1.2	6	41.603	41.603	41.416
7	3.7	6	39.210	39.210	39.210
8	11.1	6	26.994	26.994	26.994

kale weight
File: 1116ukw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	41.416				
0.015	41.416	0.451		1.68	k= 1, v=40
0.046	41.416	0.451		1.76	k= 2, v=40
0.140	41.416	0.451		1.79	k= 3, v=40
0.410	41.416	0.451		1.80	k= 4, v=40
1.2	41.416	0.451		1.80	k= 5, v=40
3.7	**39.210**	**0.112**		**1.81**	**k= 6, v=40**
11.1	26.994	3.230	*	1.81	k= 7, v=40

s = 6.786
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**3.6**	**1.1**	**12.**	**0.26**	**0.30**
EC10	5.0	2.1	12.	0.18	0.42
EC25	**8.6**	**6.0**	**12.**	**0.078**	**0.70**
EC50	16.	9.7	25.	0.10	0.62

Slope = 2.58 Std.Err. = 1.35

US EPA ARCHIVE DOCUMENT

Goodness of fit: p = 0.78 based on DF= 5.0 40.

1116UKW : kale weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	39.6	41.4	-1.78	100.	0.00
0.0150	6.00	42.9	41.4	1.46	100.	3.26e-13
0.0460	6.00	40.0	41.4	-1.45	100.	3.13e-09
0.140	6.00	39.9	41.4	-1.52	100.	6.12e-06
0.410	6.00	44.5	41.4	3.06	100.	0.00220
1.20	6.00	41.6	41.3	0.260	99.8	0.197
3.70	6.00	39.2	39.2	-0.0368	94.7	5.25
11.1	6.00	27.0	27.0	0.00396	65.2	34.8

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

onion length

File: 1116vol Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	50310.111	7187.159	11.987
Within (Error)	40	23983.138	599.578	
Total	47	74293.249		

Critical F value = 2.25 (0.05,7,40)

Since F > Critical F REJECT Ho:All groups equal

onion length

File: 1116vol Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	204.083	204.083	204.083
2	0.140	6	192.639	192.639	195.194
3	0.410	6	197.750	197.750	195.194

US EPA ARCHIVE DOCUMENT

4	1.2	6	192.195	192.195	192.195
5	3.7	6	187.833	187.833	187.833
6	11.1	6	172.556	172.556	172.556
7	33.3	6	157.133	157.133	157.133
8	100	6	98.022	98.022	98.022

onion length
File: 1116vol Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	204.083				
0.140	195.194	0.629		1.68	k= 1, v=40
0.410	195.194	0.629		1.76	k= 2, v=40
1.2	192.195	0.841		1.79	k= 3, v=40
3.7	**187.833**	**1.149**		**1.80**	**k= 4, v=40**
11.1	172.556	2.230	*	1.80	k= 5, v=40
33.3	157.133	3.321	*	1.81	k= 6, v=40
100	98.022	7.502	*	1.81	k= 7, v=40

s = 24.486
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**7.8**	**3.0**	**21.**	**0.21**	**0.38**
EC10	14.	6.6	29.	0.16	0.47
EC25	**36.**	**24.**	**55.**	**0.089**	**0.66**
EC50	1.1E+02	78.	1.4E+02	0.065	0.74

Slope = 1.46 Std.Err. = 0.292

Goodness of fit: p = 0.78 based on DF= 5.0 40.

1116VOL : onion length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	204.	195.	8.85	100.	0.00

US EPA ARCHIVE DOCUMENT

0.140	6.00	193.	195.	-2.59	100.	0.00138
0.410	6.00	198.	195.	2.56	100.	0.0222
1.20	6.00	192.	195.	-2.58	99.8	0.231
3.70	6.00	188.	192.	-4.07	98.3	1.70
11.1	6.00	173.	180.	-7.59	92.3	7.73
33.3	6.00	157.	150.	7.46	76.7	23.3
100.	6.00	98.0	100.	-2.05	51.3	48.7

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

onion weight
File: 1116vow Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	75.173	10.739	13.049
Within (Error)	40	32.900	0.823	
Total	47	108.073		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

onion weight
File: 1116vow Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	4.743	4.743	4.743
2	0.140	6	4.488	4.488	4.585
3	0.410	6	4.672	4.672	4.585
4	1.2	6	4.590	4.590	4.585
5	3.7	6	4.588	4.588	4.585
6	11.1	6	3.921	3.921	3.921
7	33.3	6	3.623	3.623	3.623
8	100	6	0.761	0.761	0.761

onion weight

US EPA ARCHIVE DOCUMENT

File: 1116vow Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	4.743				
0.140	4.585	0.303		1.68	k= 1, v=40
0.410	4.585	0.303		1.76	k= 2, v=40
1.2	4.585	0.303		1.79	k= 3, v=40
3.7	4.585	0.303		1.80	k= 4, v=40
11.1	**3.921**	**1.570**		**1.80**	**k= 5, v=40**
33.3	3.623	2.140	*	1.81	k= 6, v=40
100	0.761	7.606	*	1.81	k= 7, v=40

s = 0.907

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

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**20.**	**12.**	**34.**	**0.12**	**0.59**
EC10	25.	16.	40.	0.099	0.63
EC25	**36.**	**26.**	**51.**	**0.072**	**0.71**
EC50	55.	44.	69.	0.047	0.80

Slope = 3.71 Std.Err. = 0.664

Goodness of fit: p = 0.76 based on DF= 5.0 40.

1116VOW : onion weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	4.74	4.51	0.233	100.	0.00
0.140	6.00	4.49	4.51	-0.0227	100.	1.97e-14
0.410	6.00	4.67	4.51	0.161	100.	1.38e-13
1.20	6.00	4.59	4.51	0.0795	100.	3.37e-08
3.70	6.00	4.59	4.51	0.0772	100.	0.000657
11.1	6.00	3.92	4.49	-0.568	99.5	0.483
33.3	6.00	3.62	3.58	0.0452	79.3	20.7
100.	6.00	0.761	0.766	-0.00549	17.0	83.0

ryegrass length

File: 1116vrl Transform: NO TRANSFORMATION

US EPA ARCHIVE DOCUMENT

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	24289.615	3469.945	2.847
Within (Error)	40	48760.240	1219.006	
Total	47	73049.855		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

ryegrass length
File: 1116vrl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	395.167	395.167	399.583
2	0.140	6	403.111	403.111	399.583
3	0.410	6	400.472	400.472	399.583
4	1.2	6	365.500	365.500	376.188
5	3.7	6	371.000	371.000	376.188
6	11.1	6	376.611	376.611	376.188
7	33.3	6	391.639	391.639	376.188
8	100	6	330.694	330.694	330.694

ryegrass length
File: 1116vrl 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	399.583				
0.140	399.583	0.219		1.68	k= 1, v=40
0.410	399.583	0.219		1.76	k= 2, v=40
1.2	376.188	0.942		1.79	k= 3, v=40
3.7	376.188	0.942		1.80	k= 4, v=40
11.1	376.188	0.942		1.80	k= 5, v=40

US EPA ARCHIVE DOCUMENT

33.3	**376.188**	**0.942**		**1.81**	**k= 6, v=40**
100	330.694	3.198	*	1.81	k= 7, v=40

s = 34.914
Note: df used for table values are approximate when v > 20.

EC_x

!!!Failure#1: near-singular matrix, model possibly unsuitable.

ryegrass weight
File: 1116vrw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	66.648	9.521	8.145
Within (Error)	40	46.754	1.169	
Total	47	113.402		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

ryegrass weight
File: 1116vrw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	10.637	10.637	10.637
2	0.140	6	8.973	8.973	9.498
3	0.410	6	10.024	10.024	9.498
4	1.2	6	9.296	9.296	9.296
5	3.7	6	8.831	8.831	8.831
6	11.1	6	7.528	7.528	7.824
7	33.3	6	8.119	8.119	7.824
8	100	6	6.830	6.830	6.330

ryegrass weight

US EPA ARCHIVE DOCUMENT

File: 1116vrw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	10.6				
0.140	9.498	1.744		1.68	k= 1, v=40
0.410	**9.498**	**1.744**		**1.76**	**k= 2, v=40**
1.2	9.296	2.054	*	1.79	k= 3, v=40
3.7	8.831	2.776	*	1.80	k= 4, v=40
11.1	7.824	4.309	*	1.80	k= 5, v=40
33.3	7.824	4.309	*	1.81	k= 6, v=40
100	6.330	6.596	*	1.81	k= 7, v=40

s = 1.081

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

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**0.083**	0.0014	4.9	0.88	0.017
EC10	0.61	0.028	13.	0.66	0.047
EC25	**17.**	**3.5**	**83.**	**0.34**	**0.2**
EC50	6.9E+02	1.4E+02	3.5E+03	0.35	0.2

Slope = 0.419 Std.Err. = 113

Goodness of fit: p = 0.13 based on DF= 5.0 40.

1116VRW : ryegrass weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	10.6	10.4	0.196	100.	0.00
0.140	6.00	8.97	9.81	-0.836	93.9	6.07
0.410	6.00	10.0	9.52	0.501	91.2	8.80
1.20	6.00	9.30	9.15	0.144	87.7	12.3
3.70	6.00	8.83	8.66	0.169	83.0	17.0
11.1	6.00	7.53	8.08	-0.555	77.4	22.6
33.3	6.00	8.12	7.41	0.709	71.0	29.0
100.	6.00	6.33	6.66	-0.327	63.8	36.2

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

US EPA ARCHIVE DOCUMENT

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

soybean length
File: 1116vsl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	212055.850	30293.693	76.460
Within (Error)	40	15848.097	396.202	
Total	47	227903.947		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

soybean length
File: 1116vsl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	295.417	295.417	311.227
2	0.015	6	311.306	311.306	311.227
3	0.046	6	317.861	317.861	311.227
4	0.140	6	310.083	310.083	311.227
5	0.410	6	316.111	316.111	311.227
6	1.2	6	316.584	316.584	311.227
7	3.7	6	258.056	258.056	258.056
8	11.1	6	110.694	110.694	110.694

soybean length
File: 1116vsl 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

US EPA ARCHIVE DOCUMENT

control	311.227				
0.015	311.227	1.376		1.68	k= 1, v=40
0.046	311.227	1.376		1.76	k= 2, v=40
0.140	311.227	1.376		1.79	k= 3, v=40
0.410	311.227	1.376		1.80	k= 4, v=40
1.2	**311.227**	**1.376**		**1.80**	**k= 5, v=40**
3.7	**258.056**	**3.251**	*	**1.81**	**k= 6, v=40**
11.1	110.694	16.074	*	1.81	k= 7, v=40

s = 19.905
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**2.1**	**1.6**	**2.8**	**0.056**	**0.77**
EC10	2.9	2.3	3.5	0.046	0.81
EC25	**4.7**	**4.1**	**5.4**	**0.030**	**0.87**
EC50	8.2	7.6	8.8	0.016	0.93

Slope = 2.81 Std.Err. = 0.231

Goodness of fit: p = 0.35 based on DF= 5.0 40.

1116VSL : soybean length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	295.	312.	-16.1	100.	0.00
0.0150	6.00	311.	312.	-0.225	100.	8.03e-13
0.0460	6.00	318.	312.	6.33	100.	1.37e-08
0.140	6.00	310.	312.	-1.45	100.	3.59e-05
0.410	6.00	316.	311.	4.62	100.	0.0133
1.20	6.00	317.	309.	8.07	99.0	0.969
3.70	6.00	258.	260.	-1.45	83.3	16.7
11.1	6.00	111.	110.	0.211	35.5	64.5

soybean weight
File: 1116vsw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	6671.157	953.022	50.291

US EPA ARCHIVE DOCUMENT

Within (Error)	40	757.988	18.950
Total	47	7429.145	

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

soybean weight
File: 1116vsw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	41.667	41.667	43.074
2	0.015	6	44.271	44.271	43.074
3	0.046	6	42.535	42.535	43.074
4	0.140	6	43.822	43.822	43.074
5	0.410	6	41.179	41.179	42.012
6	1.2	6	42.845	42.845	42.012
7	3.7	6	33.333	33.333	33.333
8	11.1	6	7.083	7.083	7.083

soybean weight
File: 1116vsw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	43.074				
0.015	43.074	0.560		1.68	k= 1, v=40
0.046	43.074	0.560		1.76	k= 2, v=40
0.140	43.074	0.560		1.79	k= 3, v=40
0.410	42.012	0.137		1.80	k= 4, v=40
1.2	**42.012**	**0.137**		**1.80**	**k= 5, v=40**
3.7	33.333	3.316	*	1.81	k= 6, v=40
11.1	7.083	13.760	*	1.81	k= 7, v=40

s = 4.353
Note: df used for table values are approximate when v > 20.

US EPA ARCHIVE DOCUMENT

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**2.1**	**1.7**	**2.7**	**0.054**	**0.78**
EC10	2.7	2.2	3.3	0.047	0.81
EC25	**3.9**	**3.4**	**4.6**	**0.034**	**0.85**
EC50	6.0	5.4	6.7	0.022	0.90

Slope = 3.66 Std.Err. = 0.304

Goodness of fit: p = 0.82 based on DF= 5.0 40.

1116VSW : soybean weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	41.7	42.8	-1.09	100.	0.00
0.0150	6.00	44.3	42.8	1.52	100.	1.66e-14
0.0460	6.00	42.5	42.8	-0.218	100.	4.99e-13
0.140	6.00	43.8	42.8	1.07	100.	1.16e-07
0.410	6.00	41.2	42.8	-1.57	100.	0.000992
1.20	6.00	42.8	42.5	0.314	99.5	0.522
3.70	6.00	33.3	33.4	-0.0247	78.0	22.0
11.1	6.00	7.08	7.08	0.00313	16.6	83.4

sugarbeet length

File: 1116vbl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	54989.079	7855.583	12.436
Within (Error)	40	25267.365	631.684	
Total	47	80256.444		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

sugarbeet length

US EPA ARCHIVE DOCUMENT

File: 1116vbl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	252.750	252.750	259.708
2	0.015	6	258.805	258.805	259.708
3	0.046	6	262.000	262.000	259.708
4	0.140	6	265.278	265.278	259.708
5	0.410	6	256.278	256.278	258.889
6	1.2	6	261.500	261.500	258.889
7	3.7	6	226.806	226.806	226.806
8	11.1	6	158.250	158.250	158.250

sugarbeet length
File: 1116vbl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	259.708				
0.015	259.708	0.480		1.68	k= 1, v=40
0.046	259.708	0.480		1.76	k= 2, v=40
0.140	259.708	0.480		1.79	k= 3, v=40
0.410	258.889	0.423		1.80	k= 4, v=40
1.2	258.889	0.423		1.80	k= 5, v=40
3.7	**226.806**	**1.788**		**1.81**	**k= 6, v=40**
11.1	158.250	6.512	*	1.81	k= 7, v=40

s = 25.133
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**2.1**	**1.0**	**4.3**	**0.16**	**0.49**
EC10	3.3	1.9	5.6	0.12	0.59
EC25	**6.8**	**5.3**	**8.8**	**0.056**	**0.77**
EC50	15.	12.	20.	0.060	0.76

Slope = 1.90 Std.Err. = 0.422

US EPA ARCHIVE DOCUMENT

Goodness of fit: p = 0.94 based on DF= 5.0 40.

1116VBL : sugarbeet length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	253.	260.	-7.20	100.	0.00
0.0150	6.00	259.	260.	-1.14	100.	4.98e-07
0.0460	6.00	262.	260.	2.05	100.	7.72e-05
0.140	6.00	265.	260.	5.34	100.	0.00510
0.410	6.00	256.	260.	-3.32	99.9	0.136
1.20	6.00	261.	255.	6.08	98.3	1.74
3.70	6.00	227.	229.	-2.21	88.1	11.9
11.1	6.00	158.	158.	0.389	60.7	39.3

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

sugarbeet weight

File: 1116vbw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	8569.349	1224.193	11.390
Within (Error)	40	4299.286	107.482	
Total	47	12868.634		

Critical F value = 2.25 (0.05,7,40)

Since F > Critical F REJECT Ho:All groups equal

sugarbeet weight

File: 1116vbw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	ORIGINAL N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	68.338	68.338	69.300
2	0.015	6	67.100	67.100	69.300
3	0.046	6	72.461	72.461	69.300

US EPA ARCHIVE DOCUMENT

4	0.140	6	68.707	68.707	68.707
5	0.410	6	63.698	63.698	67.074
6	1.2	6	70.450	70.450	67.074
7	3.7	6	54.808	54.808	54.808
8	11.1	6	29.109	29.109	29.109

sugarbeet weight
File: 1116vbw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE P=.05 WILLIAMS	DEGREES OF FREEDOM
control	69.300				
0.015	69.300	0.161		1.68	k= 1, v=40
0.046	69.300	0.161		1.76	k= 2, v=40
0.140	68.707	0.062		1.79	k= 3, v=40
0.410	67.074	0.211		1.80	k= 4, v=40
1.2	**67.074**	**0.211**		**1.80**	**k= 5, v=40**
3.7	54.808	2.261	*	1.81	k= 6, v=40
11.1	29.109	6.554	*	1.81	k= 7, v=40

s = 10.367
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**1.7**	**0.79**	**3.8**	**0.17**	**0.46**
EC10	2.5	1.3	4.7	0.14	0.53
EC25	**4.6**	**3.1**	**6.8**	**0.083**	**0.68**
EC50	9.1	7.4	11.	0.046	0.81

Slope = 2.28 Std.Err. = 0.504

Goodness of fit: p = 0.76 based on DF= 5.0 40.

1116VBW : sugarbeet weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	68.3	68.6	-0.255	100.	0.00

US EPA ARCHIVE DOCUMENT

0.0150	6.00	67.1	68.6	-1.49	100.	1.14e-08
0.0460	6.00	72.5	68.6	3.87	100.	8.36e-06
0.140	6.00	68.7	68.6	0.115	100.	0.00181
0.410	6.00	63.7	68.5	-4.82	99.9	0.108
1.20	6.00	70.4	67.0	3.40	97.8	2.25
3.70	6.00	54.8	55.8	-0.983	81.3	18.7
11.1	6.00	29.1	28.9	0.168	42.2	57.8

tomato length
File: 1116vtl Transform: NATURAL LOG(Y)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	12.447	1.778	104.588
Within (Error)	40	0.674	0.017	
Total	47	13.121		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

tomato length
File: 1116vtl Transform: NATURAL LOG(Y)

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	199.611	5.292	5.325
2	0.140	6	200.250	5.297	5.325
3	0.410	6	210.833	5.349	5.325
4	1.2	6	213.667	5.363	5.325
5	3.7	6	185.972	5.221	5.221
6	11.1	6	152.556	5.003	5.003
7	33.3	6	72.389	4.269	4.269
8	100	6	52.778	3.965	3.965

tomato length
File: 1116vtl Transform: NATURAL LOG(Y)

US EPA ARCHIVE DOCUMENT

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG	TABLE WILLIAMS P=.05	DEGREES OF FREEDOM
control	5.325				
0.140	5.325	0.449		1.68	k= 1, v=40
0.410	5.325	0.449		1.76	k= 2, v=40
1.2	5.325	0.449		1.79	k= 3, v=40
3.7	**5.221**	**0.939**		**1.80**	**k= 4, v=40**
11.1	5.003	3.851	*	1.80	k= 5, v=40
33.3	4.269	13.649	*	1.81	k= 6, v=40
100	3.965	17.699	*	1.81	k= 7, v=40

s = 0.130

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

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**4.9**	**1.4**	**17.**	**0.26**	**0.29**
EC10	7.9	3.1	20.	0.19	0.40
EC25	**18.**	**11.**	**28.**	**0.099**	**0.62**
EC50	43.	28.	67.	0.093	0.64

Slope = 1.73 Std.Err. = 0.557

Goodness of fit: p = 0.55 based on DF= 5.0 16.

1116TL : tomato length

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	3.00	194.	182.	12.5	100.	0.00
0.0460	3.00	178.	182.	-3.70	100.	1.28e-05
0.140	3.00	183.	182.	1.11	100.	0.000794
0.410	3.00	178.	182.	-3.30	100.	0.0226
1.20	3.00	166.	181.	-15.1	99.7	0.348
3.70	3.00	188.	176.	12.5	96.8	3.21
11.1	3.00	149.	154.	-4.88	84.7	15.3
33.3	3.00	106.	105.	0.881	57.8	42.2

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

tomato weight

File: 1116vtw Transform: SQUARE ROOT(Y)

US EPA ARCHIVE DOCUMENT

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	164.285	23.469	89.576
Within (Error)	40	10.496	0.262	
Total	47	174.781		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho:All groups equal

tomato weight
File: 1116vtw Transform: SQUARE ROOT(Y)

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	40.872	6.378	6.461
2	0.140	6	39.079	6.241	6.461
3	0.410	6	41.781	6.461	6.461
4	1.2	6	45.843	6.764	6.461
5	3.7	6	35.179	5.904	5.904
6	11.1	6	27.704	5.203	5.203
7	33.3	6	9.732	3.067	3.067
8	100	6	1.512	1.220	1.220

tomato weight
File: 1116vtw 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	6.461				
0.140	6.461	0.280		1.68	k= 1, v=40
0.410	6.461	0.280		1.76	k= 2, v=40
1.2	6.461	0.280		1.79	k= 3, v=40
3.7	**5.904**	**1.601**		**1.80**	**k= 4, v=40**

US EPA ARCHIVE DOCUMENT

11.1	5.203	3.972	*	1.80	k= 5, v=40
33.3	3.067	11.196	*	1.81	k= 6, v=40
100	1.220	17.442	*	1.81	k= 7, v=40

s = 0.512
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound
EC5	**3.0**	**1.8**	**4.8**	**0.10**	**0.62**
EC10	4.3	2.9	6.6	0.090	0.66
EC25	**8.1**	**5.9**	**11.**	**0.068**	**0.73**
EC50	16.	13.	20.	0.046	0.81

Slope = 2.25 Std.Err. = 0.208

Goodness of fit: p = 0.34 based on DF= 5.0 40.

1116VTW : tomato weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	40.9	41.4	-0.546	100.	0.00
0.140	6.00	39.1	41.4	-2.34	100.	0.000182
0.410	6.00	41.8	41.4	0.370	100.	0.0170
1.20	6.00	45.8	41.2	4.66	99.4	0.564
3.70	6.00	35.2	38.3	-3.10	92.4	7.57
11.1	6.00	27.7	26.6	1.14	64.1	35.9
33.3	6.00	9.73	9.89	-0.154	23.9	76.1
100.	6.00	1.51	1.54	-0.0288	3.72	96.3

wheat weight
File: 1116vww Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	5.733	0.819	2.155
Within (Error)	40	15.182	0.380	
Total	47	20.916		

US EPA ARCHIVE DOCUMENT

Critical F value = 2.25 (0.05,7,40)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

wheat weight
File: 1116vww Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	6	3.940	3.940	4.030
2	0.140	6	3.764	3.764	4.030
3	0.410	6	4.378	4.378	4.030
4	1.2	6	3.855	3.855	4.030
5	3.7	6	4.213	4.213	4.030
6	11.1	6	3.501	3.501	3.501
7	33.3	6	3.477	3.477	3.477
8	100	6	3.317	3.317	3.317

wheat weight
File: 1116vww 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	4.030				
0.140	4.030	0.254		1.68	k= 1, v=40
0.410	4.030	0.254		1.76	k= 2, v=40
1.2	4.030	0.254		1.79	k= 3, v=40
3.7	4.030	0.254		1.80	k= 4, v=40
11.1	3.501	1.233		1.80	k= 5, v=40
33.3	3.477	1.302		1.81	k= 6, v=40
100	**3.317**	**1.751**		**1.81**	**k= 7, v=40**

s = 0.616
Note: df used for table values are approximate when v > 20.

Estimates of EC%

Parameter	Estimate	95% Bounds Lower	Upper	Std.Err. /Estimate	Lower Bound

US EPA ARCHIVE DOCUMENT

EC5	**6.4**	**0.097**	**4.2E+02**	**0.90**	**0.015**
EC10	23.	1.8	2.9E+02	0.55	0.080
EC25	**1.9E+02**	**29.**	**1.3E+03**	**0.41**	**0.15**
EC50	2.1E+03	16.	2.7E+05	1.0	0.0077

Slope = 0.655 Std.Err. = 0.479

Goodness of fit: p = 0.29 based on DF= 5.0 40.

1116VWW : wheat weight

Observed vs. Predicted Treatment Group Means

Dose	#Reps.	Obs. Mean	Pred. Mean	Obs. -Pred.	Pred. %Control	%Change
0.00	6.00	3.94	4.03	-0.0908	100.	0.00
0.140	6.00	3.76	4.02	-0.254	99.7	0.315
0.410	6.00	4.38	4.00	0.378	99.2	0.764
1.20	6.00	3.86	3.96	-0.107	98.3	1.70
3.70	6.00	4.21	3.89	0.327	96.4	3.59
11.1	6.00	3.50	3.75	-0.254	93.2	6.85
33.3	6.00	3.48	3.55	-0.0701	88.0	12.0
100.	6.00	3.32	3.25	0.0696	80.6	19.4

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

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

US EPA ARCHIVE DOCUMENT