Exhibit 58

Data Evaluation Record on the Acute Toxicity of Dacthal (DCPA) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....} **EPA MRID Number 49307513**

Data Requirement:

PMRA Data Code:	9.8.4 (TGAI) or 9.8.6 (EP)
EPA DP Barcode:	420873
OECD Data Point:	IIA 8.12 (TGAI) and IIIA 10.8.1.1 (EP)
EPA Guideline:	850.4100

Test material: **Dacthal Flowable Herbicide (DCPA)** **Purity:** 54.0%
Common name:
Chemical name: IUPAC:
CAS name:
CAS No.: 1861-32-1
Synonyms: DCPA

Primary Reviewer: Teresa Nelis
Environmental Scientist, CDM/CSS-Dynamac JV
Signature: Teresa Nelis
Date: 12/15/2016

Secondary Reviewer: Teri Myers
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Date: 12/22/2016

Primary Reviewer: Christina M. Wendel
EPA/OPP/EFED/ERB2/Biologist
Signature:
Date: 12/10/2021

Secondary Reviewer(s): Michael Wagman
EPA/OPP/EFED/ERB2/Senior Scientist
Signature:
Date: 12/06/2021

Reference/Submission No.: {.....}

Company Code	{.....}	[For PMRA]
Active Code	{.....}	[For PMRA]
Use Site Category:	{.....}	[For PMRA]
EPA PC Code	078701	

Date Evaluation Completed: 10-12-2021

CITATION: Sindermann, A.B., Porch, J.R, Martin, K.H., and E.S. Bodle. 2013. Dacthal: A Toxicity Test to Determine the Effects of the Test Substance on Seedling Emergence of Ten Species of Plants. Final Report. Unpublished study performed by Wildlife International, Easton, Maryland. Study sponsored by Amvac Chemical Corporation. Los Angeles, California. Wildlife International Project Number 246P-105. Study completed January 10, 2014.

This Data Evaluation Record may have been altered by the Environmental Fate and Effects Division subsequent to signing by CDM/CSS-Dynamac JV personnel

Data Evaluation Record on the Acute Toxicity of Dacthal (DCPA) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....} **EPA MRID Number 49307513**

EXECUTIVE SUMMARY:

The effect of **Dacthal Flowable Herbicide (DCPA)** on the seedling emergence of monocot (corn, *Zea mays*; onion, *Allium cepa*; ryegrass, *Lolium perenne*; and wheat, *Triticum aestivum*) and dicot (cabbage, *Brassica oleracea*; lettuce, *Lactuca sativa;* oilseed rape, *Brassica napus*; soybean, *Glycine max*; sugarbeet, *Beta vulgaris*; and tomato, *Lycopersicon esculentum*) crops was studied at nominal concentrations of 0 (negative control), 0.0034, 0.010, 0.031, 0.092, 0.28, and 0.83 lb a.i./A (lettuce); 0 (negative control), 0.031, 0.092, 0.28, 0.83. 2.5, and 7.5 lb a.i./A (onion); and 0 (negative control), 0.092, 0.28, 0.83, 2.5 and 7.5 lb a.i./A (all other species).

Treatment levels were analytically confirmed on the dosing solutions at each application rate. The measured concentrations of DCPA were <0.00089 (<LOQ, negative control), 0.0037, 0.010, 0.030, 0.088, 0.27, and 0.84 lb a.i./A (lettuce); <0.00089 (<LOQ, negative control), 0.030, 0.088, 0.27, 0.84, 2.5, and 7.4 lb a.i./A (onion); <0.00089 (<LOQ, negative control), 0.078, 0.23, 0.73, 2.3 and 7.2 lb ai/A (corn, ryegrass, wheat, soybean and tomato); and <0.00089 (<LOQ, negative control), 0.088, 0.27, 0.84, 2.5 and 7.4 lb a.i./A (cabbage, oilseed rape and sugarbeet).

The growth medium used in the seedling emergence test was a loamy sand made from kaolinite clay, industrial quartz sand and peat (loamy fine sand, pH 7.2, organic carbon 0.56%). On day 21 the surviving plants per pot were recorded and cut at soil level for measuring the plant height and dry weight.

Negative control emergence ranged from 78 to 95%. Significant inhibitions in seedling emergence were observed in onion and ryegrass. Significant inhibitions in onion emergence were 26, 18, 21 and 24% at the 0.030, 0.27, 0.84 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$), which was not dose-responsive. Significant inhibitions in ryegrass emergence of 45, 76, and 97% were observed at the 0.73, 2.3, and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$).

The reviewer based survival on number planted; the negative control survival based on number planted was 73 to 95%, whereas the study author based the negative control survival on number emerged was 93 to 100%. However, if survival is based on number planted, as the reviewer did, the mean control seedling survival does not meet the OCSPP 850.4100 test validity element of at least 90% survival at test termination for two species, lettuce (73%), and soybean (85%). The reviewer found significant inhibitions in onion survival of 27, 16, 19 and 22% at the 0.030, 0.27, 0.84 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$), which was not a dose-response. However, the observed significance levels may partially be driven by a combination of high control performance, and two replicates in the treatment level that brought down the mean including a low performer (60% emergence), and a replicate with 0% survival. Additionally, the 95% CI for the lowest treatment level (0.030 lb a.i./A) encompasses the control mean. The reviewer also found significant inhibitions in ryegrass survival of 50, 76 and 100% at the 0.73, 2.3, and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$).

Significant inhibitions were found in the height of corn, oilseed rape, onion, ryegrass, sugarbeet, tomato, and wheat compared to the negative control. Significant sugarbeet height inhibitions were 38, 64, and 76% at the 0.84, 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$). Significant inhibitions in ryegrass height were 45 and 77% at the 0.73 and 2.3 lb a.i./A treatment levels, respectively; there was 100% mortality at the 7.5 lb a.i./A treatment level (Jonckheere-Terpstra Step-Down test, $p<0.05$). The reviewer also found significant decreases in oilseed rape height of 14 and 6% at the 2.5 and 7.4 lb a.i./A treatment levels, respectively (Mann-Whitney U Two-Sample test, $p<0.05$), and in tomato height of 14, 39 and 67% at the 0.73, 2.3 and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$). Significant inhibitions in corn were 26% at 7.2 lb ai/A and in onion were 32% at 7.5 lb a.i./A (Williams test, $p<0.05$); significant inhibitions in wheat were 14% at 7.2 lb a.i./A (Dunnett's test, $p<0.05$).

Significant inhibitions in the dry weight of corn, oilseed rape, onion, ryegrass, sugarbeet, tomato, and wheat were observed compared to the negative control. Significant inhibitions in sugarbeet dry weight were 33, 81 and 92% at the 0.84, 2.5 and 7.4 lb a.i./A treatment levels, respectively (Jonckheere-Terpstra Step-Down test, $p<0.05$). Significant decreases in ryegrass dry weight of 50 and 87% were observed at the 0.73 and 2.3 lb a.i./A treatment levels, respectively; there was 100% mortality at 7.4 lb a.i./A (Mann-Whitney U Two-Sample test, $p<0.05$). Significant inhibitions in oilseed rape dry weight were 6, 13 and 7% at the 0.84, 2.5 and 7.4 lb a.i./A treatment

levels, respectively (Mann-Whitney U Two-Sample test, $p<0.05$). Significant decreases in onion dry weight were 25 and 38% at the 2.5 and 7.4 lb a.i./A treatment levels, respectively, and significant inhibitions in tomato dry weight were 53 and 74% at the 2.3 and 7.2 lb a.i./A treatment levels, respectively (Jonckheere-Terpstra Step-Down test, $p<0.05$). Although not statistically significant, the 0.73 lb a.i./A level was considered to also have treatment related effects (14% decrease, compared to negative control) that were narrowly not detected in the statistical test ($p=0.09$). However, this difference may be attributed to the single poor performing replicate in the control (mean replicate weight of 0.1g), which was lower than any other replicate mean in the other controls or the three lowest treatment concentrations. Significant dry weight inhibitions in corn and wheat were 41 and 38%, respectively, at the 7.2 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

The most sensitive dicot was sugarbeet, based on height, with NOAEC and IC_{25} values of 0.27 and 0.548 lb a.i./A, respectively. The most sensitive monocot was ryegrass, based on survival, with NOAEC and IC_{25} values of 0.23 and 0.277 lb a.i./A, respectively. Seedling emergence studies are intended to capture sub-lethal effects; therefore, survival is not expected to be the most sensitive endpoint. However, survival in ryegrass was the most sensitive endpoint overall for monocot species, and there was potentially a strong effect of low emergence and low survival due to treatment on ryegrass that may have confounded growth effects. Ryegrass had a very steep dose-response with low effects (generally <10%, except for height at 13%) at 0.23 lb a.i./A, but with high effects approaching 50% at 0.73 lb a.i./A, so that even though there is some uncertainty with the IC_{25} endpoint, we can be fairly certain that an accurate IC_{25} lies between these two concentrations.

Based on the phytotoxicity rating system used by the study author, there were no to slight effects in onion, wheat, cabbage, and soybean; moderate effects in corn and tomato; and severe effects in ryegrass, sugarbeet, oilseed rape and lettuce. Phytotoxic effects included chlorosis, necrosis, leaf curl, stem curl, and lodging; the effects were dose-related in ryegrass, wheat, corn, sugarbeet, and tomato.

Based on the results of the preliminary non-GLP range-finding test using applications of 0.012 to 7.5 lb a.i./A DCPA, lettuce height and dry weight showed inhibitions in a dose-responsive relationship. For lettuce the fresh weight reductions a maximum of 96% were observed; and for height reductions a maximum of 69% were observed. Therefore, based on the results of the non-GLP range-finding the application rates for the lettuce portion of the definitive study, were: 0.0037, 0.010, 0.030, 0.088, 0.27, and 0.84 lb a.i./A (lettuce). Although inhibitions >25% were observed in some concentrations during the test, these were not dose-responsive and the IC25 is considered above the highest test concentration for all endpoints, which presents a contradiction with the results that were observed in the range-finding study. Results were further confounded in the definitive study due the negative control survival for lettuce was 73% (based on number planted), although survival in the lettuce negative control of the range-finder was also below the guideline recommendation of 90% (83% survival in range-finder controls). The lettuce portion of the study is classified as **supplemental and may be used for risk characterization only.** Based on these results and uncertainties, if application rates result in higher estimated exposure concentrations than the concentration tested in this study, additional data may be required for lettuce (only).

Maximum Labeled Rate: Not reported

Monocot

Most sensitive monocot: Ryegrass, based on survival*

EC_{50}/IC_{50}: 0.688 lb a.i./A	95% C.I.: 0.51-0.929 lb a.i./A
EC_{25}/IC_{25}: 0.277 lb a.i./A	95% C.I.: 0.182-0.382 lb a.i./A
EC_{05}/IC_{05}: 0.0749 lb a.i./A	95% C.I.: 0.0364-0.122 lb a.i./A
NOAEC: 0.23 lb a.i./A	
LOAEC: 0.73 lb a.i./A	
Slope: 1.71	95% C.I.: 1.33-2.09 lb a.i./A

***Studies are designed to capture sub-lethal effects; therefore, survival is not expected to be the most sensitive endpoint. However, low emergence and low survival in ryegrass at the highest three treatment levels may have confounded growth effects in ryegrass.**

Dicot

Most sensitive dicot: Sugarbeet, based on height

EC_{50}/IC_{50}: 1.62 lb a.i./A	95% C.I.: 1.4-1.89 lb a.i./A
EC_{25}/IC_{25}: 0.548 lb a.i./A	95% C.I.: 0.438-0.672 lb a.i./A
EC_{05}/IC_{05}: 0.115 lb a.i./A	95% C.I.: 0.0532-0.175 lb a.i./A
NOAEC: 0.27 lb a.i./A	
LOAEC: 0.84 lb a.i./A	
Slope: N/A	95% C.I.: N/A

Table 1 (Tier II studies). Summary of most sensitive parameters by species (lb a.i./A).

Species	Endpoint	NOAEC	IC_{05}	IC_{25}	IC_{50}
Cabbage	None	7.4	ND	>7.4	>7.4
Corn	Dry Weight	2.3	1.68	4.53	9.04
Lettuce[1]	None	0.84	ND	>0.84	>0.84
Oilseed Rape	Height	0.27	0.328	>7.4	>7.4
Onion	Dry Weight	0.84	0.0568	1.99	>7.4
Ryegrass	Survival[a]	0.23	0.0749	0.277	0.688
Soybean	None	7.2	NC	>7.2	>7.2
Sugarbeet	Height	0.27	0.115	0.548	1.62
Tomato[2]	Dry Weight	0.23	0.301	1.07	2.57
Wheat	Dry Weight	2.3	2.53	5.64	9.87

NC – not calculable; ND – not determined

[1] The definitive study resulted in no effects observed at the tested rates, which were generally below rates tested for other species. However, based on the results of the preliminary non-GLP range-finding test lettuce height and dry weight showed inhibitions in a dose-responsive relationship that overlapped with these rates (testing between 0.0037 and 0.84 lb a.i./A. There is uncertainty as to what caused this discrepancy between the range-finding study and the definitive study. Additionally, survival in lettuce controls did not meet the guideline validity criteria of 90%.

[a] Studies are designed to capture sub-lethal effects; therefore, survival is not expected to be the most sensitive endpoint. However, there is a strong effect of low emergence and low survival on ryegrass that may have confounded growth effects. Ryegrass had a very steep dose-response with low effects (generally <10%, except for height at 13%) at 0.23 lb a.i./A, but with high effects approaching 50% at 0.73 lb a.i./A, so that even though there is some uncertainty with the IC25 endpoint, we can be fairly certain that an accurate IC25 lies between these two concentrations.

[2] Although not statistically significant, the 0.73 lb a.i./A was considered to also have treatment related effects (14% decrease, compared to negative control) that were narrowly not detected in the statistical test (p=0.09). This difference may be attributed to the single poor performing replicate in the control (mean replicate weight of 0.1g), which was lower than any other replicate mean in the other controls or the three lowest treatment concentrations. Therefore, the NOAEC was determined to be 0.23 lb a.i./A.

This study **is scientifically sound** and is classified as **acceptable for all species *except ryegrass and lettuce.*** For ryegrass, the study is considered **supplemental and may be used to calculate risk quotients (*for endpoints with survival as most sensitive endpoint*) and** for lettuce, the study is considered **supplemental and may be used for risk characterization only.**

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: This study was conducted in compliance with Series 850-Ecological Effects Test Guidelines, OCSPP Number 850.4100: Seedling Emergence (2012). The reviewer evaluated the study methods according to EPA Ecological Effects Test Guidelines, OCSPP Guideline 850.4100: Seedling Emergence (January 2012).

1. Seedling emergence studies are intended to capture sub-lethal effects; therefore, survival is not expected to be the most sensitive endpoint. However, survival in ryegrass was the most sensitive endpoint overall for monocot species, and there was potentially a strong effect of low emergence and low survival on ryegrass that may have confounded growth effects. The results for ryegrass should be interpreted with caution.
2. The reviewer determined survival based on the number planted; the negative control for survival ranged from 73 to 95% for all species tested. The study author determined survival based on number emerged; the

negative control for survival ranged from 93 to 100% for all species tested. The study author's survival results differed from the reviewer's as the study author found no significant inhibitions in survival for any species. If survival is based on number planted, the mean control seedling survival does not meet the OCSPP 850.4100 test validity element of at least 90% survival at test termination for two species, lettuce (73%), and soybean (85%). This is a study deficiency for these two species only.

3. The study author used 5 seeds per replicate over 8 replicates, which does meet the OCSPP guideline of 40 seeds per treatment level. The study criteria suggest planting 10 seeds per replicate, OCSPP guidance suggests a minimum of 4 seeds per replicate per treatment and a minimum of 40 seeds per treatment, while OECD recommends a minimum of 5 seeds per replicate. This is a minor deficiency.
4. The physico-chemical properties of the test material were not reported. This is a minor deficiency.
5. Soil CEC and % moisture were not reported. This is a minor deficiency.
6. The relative humidity during the study ranged from 16-90% for all species tested. The mean relative humidity for the subset of species tested together: corn, *Zea mays*; wheat, *Triticum aestivum;* soybean, *Glycine max*; ryegrass, *Lolium perenne*; and tomato, *Lycopersicon esculentum* was 66% ± 6% (standard deviation (SD)). The mean relative humidity for the second subset of species tested together: onion, *Allium cepa*; sugarbeet, *Beta vulgaris;* cabbage, *Brassica oleracea*; lettuce, *Lactuca sativa; and* oilseed rape, *Brassica napus* was 55% ± 11%(SD). OCSPP recommends relative humidity of 70% (daytime) ± 15%. This is considered a minor deviation.
7. The temperature during the study ranged from 15 to 36°C for all species tested. The mean temperature for the subset of species tested together: corn, *Zea mays*; wheat, *Triticum aestivum;* soybean, *Glycine max*; ryegrass, *Lolium perenne*; and tomato, *Lycopersicon esculentum* was 26°C ± 2°C (SD). The mean temperature for the second subset of species tested together: onion, *Allium cepa*; sugarbeet, *Beta vulgaris;* cabbage, *Brassica oleracea*; lettuce, *Lactuca sativa; and* oilseed rape, *Brassica napus* was 22°C ± 1°C (SD). OCSPP recommends temperature of 25/20°C (daytime/nighttime) ± 6°C. This is considered a minor deviation.

The deficiencies *did not* have an impact on the acceptability of this study, with the exception of ***two of the test species, ryegrass and lettuce, only***.

COMPLIANCE: Signed and dated GLP, Quality Assurance and Data Confidentiality statements were provided. This study was conducted in compliance with Good Laboratory Practice Standards as published by U.S. Environmental Protection Agency (40 CFR Part 160), August 1989; OECD Principles of Good Laboratory Practice (ENV/MC/CHEM (98) 17); and Japan MAFF, 59 NohSan, Notification No. 6283, Agricultural Production Bureau, 1 October 1999. As noted, periodic analyses of well water and soil for potential contaminants were not performed according to GLP, but were performed using a certified laboratory and standard U.S. EPA analytical methods. Characterization of the reference substance and the stability of the reference substance under conditions of storage at the test site were determined before the completion of the study in accordance with GLP, however, characterization was conducted after test initiation.

A. MATERIALS:

1. Test Material DCPA (Dacthal Flowable Herbicide)

Description: Off-white liquid

Lot No./Batch No.: BT2242030

Purity: 54.0%

Stability of compound under test conditions: Recovery of test substance in spray solutions ranged from 83-97% for corn, wheat, ryegrass, soybean and tomato (n=9), and range from 93 to 107% for onion, cabbage, oilseed rape, lettuce, and sugarbeet. Matrix fortified sample recoveries ranged from 89-99%. Stability (verification) of the test material

was reported to be 83.1 to 98.6 % of nominal concentrations.
(OECD recommends chemical stability in water and light)

Storage conditions of test chemicals: At ambient room conditions, out of direct sunlight.

Table 2. Physical/chemical properties of DCPA.

Parameter	Values	Comments
Water solubility at 20˚C	Not reported	
Vapor pressure	Not reported	
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

2. Test organism:

Monocotyledonous species: Corn (*Zea mays*, Poaceae; Nothstine Dent OG); Onion (*Allium cepa*, Liliaceae; Yellow Granex PRR Hybrid 5208); Ryegrass (*Lolium perenne*, Poaceae; Gator 3 Perennial); and Wheat (*Triticum aestivum*, Poaceae; Glenn Hard Red Spring). *EPA recommends four monocots in two families, including corn.*
Dicotyledonous species: Cabbage (*Brassica oleracea*, Brassicaceae; Late Flat Dutch); Lettuce (*Lactuca sativa*, Asteraceae; Summertime); Oilseed Rape (*Brassica napus*, Brassicaceae; Dwarf Essex); Soybean (*Glycine max*, Fabaceae; Maverick); Sugarbeet (*Beta vulgaris*, Chenopodiaceae; 38WVR0852); and Tomato (*Lycopersicon esculentum*, Solanaceae; Rutgers). *EPA recommends six dicots in four families, including soybean and a root crop.*
OECD recommends a minimum of three species selected for testing, at least one from each of the following categories: Category 1: ryegrass, rice, oat, wheat, and sorghum; Category 2: mustard, rape, radish, turnip, and Chinese cabbage; Category 3: vetch, mung bean, red clover, fenugreek, lettuce, and cress.
Seed source: Wheat, Corn, and Oilseed Rape from Johnny's Selected Seeds, Winslow ME; Onion from Park Seed Company, Greenwood, SC; Ryegrass and Tomato from Meyer Seed Company, Baltimore, MD; Cabbage and Lettuce from Sustainable Seed Company, Covelo, CA; Soybean from Missouri Foundation Seeds, Columbia, MO; and Sugarbeet from Beta Seed Inc., Moorhead, MN.
Prior seed treatment/sterilization: None.
Historical % germination of seed: Corn (94%), Onion (96%), Ryegrass (90%), Wheat (94%), Cabbage (99%), Lettuce (98%), Oilseed Rape (96%), Soybean (91%), Sugarbeet (98%), and Tomato (90%).

Seed storage, if any: Not reported.

B. STUDY DESIGN:

1. Experimental Conditions

a. Limit test: None.

b. Range-finding study: A preliminary non-GLP range-finding test was conducted, and after the application of 0.012 to 7.5 lb a.i./A DCPA (dacthal), onion emergence, survival and dry weight, ryegrass emergence, sugarbeet height and dry weight, lettuce height and dry weight, and tomato height and dry weight showed inhibitions (reductions) in a dose-responsive relationship. Emergence inhibitions (reductions) of a maximum of 100% were observed; survival inhibitions (reductions) of a maximum of 67% were observed; fresh weight inhibitions (reductions) of a maximum of 98% were observed; and height inhibitions (reductions) were a maximum of 80% were observed. Limited results (data summary tables only) are presented in Appendix 16 (pg. 143-152).

c. Definitive Study

Table 3: Experimental Parameters – Seedling Emergence.

Parameters	Seedling Emergence	
	Details	**Remarks**

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		Criteria
Duration of the test	21 days	*Recommended test duration is 14-21 days.* *OECD recommends that the test be terminated no sooner than 14 days after 50 percent of the control seedlings have emerged*
Number of seeds/plants/species/ replicate	Eight pots (replicates) with 5 seeds per pot.	Seedlings were impartially assigned to test groups prior to application. *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.*
<u>Number of replicates</u> Control: Adjuvant control: Treated:	8 N/A 8	*Four replicates per dose should be used.* *OECD recommends a minimum of four replicates per treatment*
<u>Test concentrations (lb ai/A)</u> Nominal:	<u>Lettuce:</u> 0 (negative control), 0.0034, 0.010, 0.031, 0.092, 0.28, and 0.83 lb a.i./A <u>Onion:</u> 0 (negative control), 0.031, 0.092, 0.28, 0.83. 2.5, and 7.5 lb a.i./A <u>Corn, wheat, soybean, ryegrass, tomato, cabbage, oilseed rape, and sugarbeet:</u> 0 (negative control), 0.092, 0.28, 0.83, 2.5 and 7.5 lb a.i./A	The study author reported nominal application rates of 0.0046, 0.014 0.041, 0.12, 0.37 and 1.1 pt/A for lettuce; 0.041, 0.12, 0.37, 1.1, 3.3, and 10 pt/A for onion; and 0.12, 0.37, 1.1, 3.3, and 10 pt/A for all other crops. Spray solutions were prepared in well water purified by reverse osmosis (R/O). The negative control group was sprayed with well water purified with reverse osmosis only. Measured application rates and conversions are provided in Appendix 1 below. *Five test concentrations should be used with a dose range of 2X or 3X progression*
Measured:	<u>Lettuce:</u> <0.00089 (<LOQ, negative control), 0.0037, 0.010, 0.030, 0.088, 0.27, and 0.84 lb a.i./A <u>Onion:</u> <0.00089 (<LOQ, negative control), 0.030, 0.088, 0.27, 0.84, 2.5, and 7.4 lb a.i./A <u>Corn, wheat, soybean, ryegrass, and tomato</u>: <0.00089 (<LOQ, negative control), 0.078, 0.23, 0.73, 2.3 and 7.2 lb a.i./A <u>Cabbage, oilseed rape, and sugarbeet</u>: <0.00089 (<LOQ, negative control), 0.088, 0.27, 0.84, 2.5 and 7.4 lb a.i./A	*OECD recommends three concentrations, preferably with application rates equivalent to 0.0 (control), 1.0, 10.0 and 100 mg substance per kg of oven-dried soil.*

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Parameters	Seedling Emergence	
	Details	**Remarks** ***Criteria***
Method and interval of analytical verification LOQ: LOD:	Samples of the dosing solutions were analyzed by Agilent Series 1100 High Performance Liquid Chromatograph, YMC-Pack ODS-AM column (150mm) with an Agilent 1100 Series Variable Wavelength Detector (220nm). 0.00089 lb a.i./A N/A	Samples for verification of the spray mixture were collected on August 20 and October 8, 2013 and were found to be 83.1 to 98.6 % of nominal concentrations (Table 1 in study report; pg. 24).
Adjuvant (type, percentage, if used)	N/A	
Test container (pot) Size/Volume Material: (glass/polystyrene)	16 cm diameter by 12 cm depth Plastic	*Non-porous containers should be used. OECD recommends that non-porous plastic or glazed pot be used.*
Growth facility	Greenhouse	
Method/depth of seeding	Five seeds were planted per pot using a template. Corn, wheat and soybean: 20mm depth All others: 10mm depth	
Test material application Application time including the plant growth stage Number of applications Application interval Method of application	 After planting. 1 N/A- single application The test material was applied at 200L/ha using a DeVries Research Track sprayer with a Teejet 8002E nozzle, 20 psi, applied 41 cm from the soil surface. Calibrations of sprayer system indicated actual spraying rates of 201-202 L/ha.	

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Parameters	Seedling Emergence	
	Details	**Remarks** ***Criteria***
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 N/A Loamy fine sand 89 3 8 7.2 (in water) 6.7 (in 0/01 M $CaCl_2$) 0.56% Not Reported Not Reported	Soil was a mixture of kaolinite clay, industrial quartz sand and peat with crushed limestone added to buffer pH. Organic matter 0.96% A sample of soil representative of that used in this study was sent to Agvise Laboratories, Inc., in Northwood, ND, for analysis of the particle size distribution and organic matter content of the soil. The soil used for plant studies are periodically screened for pesticides and metals. No analytes were measured at levels that were expected to have an impact on the study. Although the complete reports were filed in the archives at EAG Laboratories the results of these analyses were not provided in the study report for reference. *Soil mixes containing sandy loam, loam, or clay loam soil with no greater than 2% organic matter 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.*
Details of nutrient medium, if used	N/A	
Watering regime and schedules Water source/type: Volume applied: Interval of application: Method of application:	 Laboratory well water. Not specified. As needed. The plants were bottom watered every, one to three days, as needed.	The days on which watering occurred are listed in Appendix 5 (pgs. 67-68) of the study report. The well water used for plant studies are periodically screened for pesticides and metals. No analytes were measured at levels that were expected to have an impact on the study. Although the reports were filed in the archives at EAG Laboratories the results of these analyses were not provided in the study report for reference. *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.*
Any pest control method/fertilization, if used	A slow release fertilizer was added to soil before planting.	

Parameters	Seedling Emergence	
	Details	**Remarks** ***Criteria***
Test conditions Temperature: Photoperiod: Light intensity and quality: Relative humidity: Temperature: Photoperiod: Light intensity and quality: Relative humidity:	Corn, wheat, soybean, ryegrass and tomato: Mean 26.39, range 17.54-35.73˚C 16L:8D Natural sunlight supplemented with artificial light. Mean 12.0, range 10.2-13.7 moles PAR Mean 66.39 ±6.05%(SD), range 35.56-90.50% Onion, sugarbeet, cabbage, lettuce, and oilseed rape: Mean 22.09, range 15.27-32.57˚C 16L:8D Natural sunlight supplemented with artificial light. Mean 17.6, range 13.6-21.0 moles PAR Mean 54.99 ± 6.05%(SD), range 16.01-88.20%	Environmental conditions are summarized in Appendix 5 (pgs. 67-68) of the study report. *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	
Other parameters, if any	None	

2. Observations:

Table 4: Observation Parameters - Seedling Emergence.

Parameters	Seedling Emergence	
	Details	**Remarks**
Parameters measured (e.g., number of germinated seeds, emerged seedlings, plant height, dry weight or other endpoints)	- Emergence - Survival - Height - Mean dry weight - Phytotoxicity	
Measurement technique for each parameter	Phytotoxicity and emergence were visually determined. Height was measured to the apical meristem or the tip of the longest leaf. Mean plant weight was estimated by cutting plant at soil surface and measuring the total dry weight per replicate divided by number of plants weighed following oven drying.	

Parameters	Seedling Emergence	
	Details	**Remarks**
Observation intervals	Each pot was inspected weekly (days 7, 14, & 21) and phytotoxicity assessments performed. Plant height and dry weight were recorded at study termination (day 21).	
Other observations, if any	N/A	
Were raw data included?	Yes	
Phytotoxicity rating system, if used	0- No effect; 10-30- Slight effect; 40-60- Moderate effect; 70-90- Severe effect; 100 = death of entire plant.	Frans, Robert E. and Ronald E. Talbert. 1977. Design of Field Experiments and the Measurement and Analysis of Plant Responses, pp. 15-23, in B. Truelove, ed., Research Methods in Weed Science. Southern Weed Science Society, Auburn University, Alabama

II. RESULTS and DISCUSSION:

A. INHIBITORY EFFECTS:

1. Seedling Emergence:

Negative control emergence ranged from 78 to 95%. The study author found significant inhibitions in seedling emergence in onion and ryegrass. Significant inhibitions in onion emergence were 26 and 24% at the 0.031 and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$). Significant inhibitions in ryegrass emergence of 45, 76, and 97% were observed at the 0.83, 2.5, and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$). The reviewer found similar significant inhibitions in ryegrass emergence (Williams test, $p<0.05$). The reviewer found significant decreases in onion emergence of 26, 18, 21 and 24% at the 0.030, 0.27, 0.84 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$), which was not dose-responsive, but encompassed more doses than the study author results.

The study author based survival on number emerged; negative control survival based on number emerged was 93 to 100%. The study author found significant inhibitions in ryegrass survival, but not in any other species tested. Significant inhibition in ryegrass survival was 100% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$). The reviewer based survival on number planted; negative control survival based on number planted was 73 to 95%. The reviewer found significant inhibitions in onion survival of 27, 16, 19 and 22% at the 0.030, 0.27, 0.84 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$), which was not dose-responsive. The reviewer also found significant inhibitions in ryegrass survival of 50, 76 and 100% at the 0.73, 2.3, and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$).

The study author found significant inhibitions in the height of corn, oilseed rape, onion, ryegrass, sugarbeet, tomato, and wheat compared to the negative control. Significant sugarbeet height inhibitions were 38, 64, and 76% at the 0.83, 2.5 and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$). Significant inhibitions in ryegrass height were 45 and 77% at the 0.83 and 2.5 lb a.i./A treatment levels, respectively; there was 100% mortality at the 7.5 lb a.i./A treatment (Dunnett's test, $p<0.05$). Significant inhibitions in tomato height of 39 and 67% were observed at 2.5 and 7.5 lb a.i./A (Dunnett's test, $p<0.05$). Significant decrease in oilseed rape height was 14% at the 2.5 lb

a.i./A treatment level; and significant inhibitions in corn, onion and wheat height were 26, 32, and 14%, respectively, at the 7.5 lb ai/A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

The reviewer found similar significant inhibitions in height as the study author in sugarbeet (Jonckheere-Terpstra Step-Down test, $p<0.05$); ryegrass (Jonckheere-Terpstra Step-Down test, $p<0.05$); corn and onion (Williams test, $p<0.05$), and wheat (Dunnett's test, $p<0.05$). The reviewer found significant decreases in oilseed rape height of 14 and 6% at the 2.5 and 7.4 lb a.i./A treatment levels, respectively (Mann-Whitney U Two-Sample test, $p<0.05$), and in tomato height of 14, 39 and 67% at the 0.73, 2.3 and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$).

The study author found significant inhibitions in the dry weight of corn, onion, ryegrass, sugarbeet, tomato, and wheat compared to the negative control. Significant inhibitions in sugarbeet dry weight were 34, 82 and 92% at the 0.83, 2.5 and 7.5 lb a.i./A treatment levels, respectively (Dunnett's test, $p<0.05$). Significant decreases in ryegrass dry weight of 49 and 87% were observed at the 0.83 and 2.5 lb ai/A treatment levels, respectively; there was 100% mortality at 7.5 lb a.i./A (Dunnett's test, $p<0.05$). Significant inhibitions in tomato dry weight were also 53 and 74% at the 2.5 and 7.5 lb a.i./A treatment levels, respectively (Dunnett's test, $p<0.05$). Significant inhibitions in corn, onion and wheat dry weight were 41, 38 and 38%, respectively, at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

The reviewer found significant inhibitions in the dry weight of corn, oilseed rape, onion, ryegrass, sugarbeet, tomato, and wheat compared to the negative control. The reviewer found similar significant inhibitions in dry weight as the study author in sugarbeet and tomato (Jonckheere-Terpstra Step-Down test, $p<0.05$); ryegrass (Mann-Whitney U Two-Sample test, $p<0.05$); and corn and wheat (Dunnett's test, $p<0.05$). Significant inhibitions in oilseed rape dry weight were 6, 13 and 7% at the 0.84, 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$). Significant decreases in onion dry weight were 25 and 38% at the 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$). Although not statistically significant, the 0.73 lb a.i./A was considered to also have treatment related effects (14% decrease, compared to negative control) that were narrowly not detected in the statistical test ($p=0.09$). However, this difference may be attributed to the single poor performing replicate in the control (mean replicate weight of 0.1g), which was lower than any other replicate mean in the other controls or the three lowest treatment concentrations.

Based on the study author's results, the most sensitive monocot was ryegrass, based on emergence, with NOAEC and IC_{25} values of 0.28 and 0.55 lb a.i./A, respectively; and the most sensitive dicot was sugarbeet, based on height, with NOAEC and IC_{25} values of 0.28 and 0.46 lb a.i./A, respectively.

Based on the phytotoxicity rating system used by the study author, there were no to slight effects in onion, wheat, cabbage, and soybean; moderate effects in corn and tomato; and severe effects in ryegrass, sugarbeet, oilseed rape and lettuce. Phytotoxic effects included chlorosis, necrosis, leaf curl, stem curl, and lodging; the effects were dose-related in ryegrass, wheat, corn, sugarbeet, and tomato.

B. REPORTED STATISTICS BY THE STUDY AUTHOR:

Plant shoot height, shoot dry weight, percent emergence and percent survival means were determined. Parametric assumptions for normal distribution and homogeneity of variance were tested. If appropriate, effects of treatment were evaluated with an ANOVA, and the treatment groups were compared to controls with a Dunnett's test. When assumptions were not met, statistical results were still accepted due to the robust nature of the Dunnett's test. A probability of less than 0.05 was considered statistically significant. Results of the Dunnett's test were used to help establish the NOER. Statistical analyses also included the determination of effect rates (ERX estimates) and their confidence limits, if necessary. ER25 and ER50 estimates were calculated when reductions in test endpoints among one or more treatment groups were at least 25% or 50%, respectively, relative to control means. Where reductions in treatment groups were less than 25% or 50% compared to the control, the ER25 or ER50 values were considered to be greater than the highest treatment group. The data for ryegrass survival was not conducive to analysis by non-linear regression, therefore effect rates (ERx estimates)

were calculated using the ICPIN linear interpolation method. All statistical computations were performed on a personal computer using SAS version 8. Nominal concentrations were used for all analyses.

Table 5: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for height (lb a.i./A)									
	height (cm)	NOEC	ER_{05}	95%CI	ER_{25}	95%CI	ER_{50}	95%CI	slope	95%CI
Cabbage	14.5-15.3	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Corn[1]	56.5-78.2	2.5	ND	N/A	6.61	4.08-10.69	>7.5	N/A	N/A	N/A
Lettuce	5.73-8.15	0.83	ND	N/A	>0.83	N/A	>0.83	N/A	N/A	N/A
Oilseed Rape[2]	16-18.6	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Onion[3]	7.59-11.2	2.5	ND	N/A	6.08	2.31-15.98	>7.5	N/A	N/A	N/A
Ryegrass[4]	4.23-18.1	0.28	ND	N/A	0.51	0.23-1.15	1.06	0.65-1.73	N/A	N/A
Soybean	33.5-36.5	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Sugarbeet[5]	3.71-15.4	0.28	ND	N/A	0.46	0.31-0.68	1.58	1.24-2.03	N/A	N/A
Tomato[6]	7.91-23.7	0.83	ND	N/A	1.65	1.0-2.73	4.27	3.23-5.63	N/A	N/A
Wheat[7]	45.2-52.7	2.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

[1] Significant decrease in corn height, inhibition of 26% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

[2] Significant decrease in oilseed rape height, inhibition of 14% at the 2.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$). The effect was not considered treatment related.

[3] Significant decrease in onion height, inhibition of 32% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

[4] Significant decrease in ryegrass height, inhibition of 45 and 77% at the 0.83 and 2.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$). There was 100% mortality at the 7.5 lb a.i./A treatment level.

[5] Significant decrease in sugarbeet height, inhibition of 38, 64, and 76% at the 0.83, 2.5 and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$).

[6] Significant decrease in tomato height, inhibition of 39 and 67% at the 2.5 and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$).

[7] Significant decrease in wheat height, inhibition of 14% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

Table 5a: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for biomass (lb a.i./A)									
	weight (g)	NOEC	ER_{05}	95%CI	ER_{25}	95%CI	ER_{50}	95%CI	slope	95%CI
Cabbage	0.342-0.404	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Corn[1]	0.918-1.58	2.5	ND	N/A	4.77	2.92-7.81	>7.5	N/A	N/A	N/A
Lettuce	0.0913-0.199	0.83	ND	N/A	>0.83	N/A	>0.83	N/A	N/A	N/A
Oilseed Rape	0.628-0.754	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Onion[2]	0.00968-0.0156	2.5	ND	N/A	2.0	0.20-20.49	>7.5	N/A	N/A	N/A
Ryegrass[3]	0.0045-0.035	0.28	ND	N/A	0.55	0.28-1.08	0.98	0.63-1.52	N/A	N/A
Soybean	0.97-1.1	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Sugarbeet[4]	0.0237-0.281	0.28	ND	N/A	0.53	0.37-0.74	1.16	0.92-1.47	N/A	N/A
Tomato[5]	0.065-0.255	0.83	ND	N/A	1.08	0.47-2.51	2.78	1.69-4.57	N/A	N/A
Wheat[6]	0.185-0.3	2.5	ND	N/A	6.05	4.48-8.18	>7.5	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

[1] Significant decrease in corn dry weight, inhibition of 41% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

[2] Significant decrease in onion dry weight, inhibition of 38% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

[3] Significant decrease in ryegrass dry weight, inhibition of 49 and 87% at the 0.83 and 2.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$). There was 100% mortality at the 7.5 lb a.i./A treatment level.

[4] Significant decrease in sugarbeet dry weight, inhibition of 34, 82 and 92% at the 0.83, 2.5 and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$).

[5] Significant decrease in tomato dry weight, inhibition of 53 and 74% at the 2.5 and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$).

[6] Significant decrease in wheat dry weight, inhibition of 38% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

Table 5b: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for emergence (lb a.i./A)									
	%	NOEC	ER_{05}	95%CI	ER_{25}	95%CI	ER_{50}	95%CI	slope	95%CI
Cabbage	88-98	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Corn	93-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Lettuce	55-80	0.83	ND	N/A	>0.83	N/A	>0.83	N/A	N/A	N/A
Oilseed Rape	90-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Onion[1]	70-95	2.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Ryegrass[2]	3-95	0.28	ND	N/A	0.55	0.32-0.96	1.11	0.75-1.63	N/A	N/A
Soybean	90-98	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Sugarbeet	95-98	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Tomato	85-95	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Wheat	93-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

[1] Significant decrease in onion emergence, inhibition of 26 and 24% at the 0.031 and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$). Lack of emergence in one replicate at 0.031 lb a.i./A was considered an outlier by the study author.

[2] Significant decrease in ryegrass emergence, inhibition of 45, 76, and 97% at the 0.83, 2.5, and 7.5 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$).

Table 5c: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for survival (lb a.i./A), based on number emerged									
	%	NOEC	ER_{05}	95%CI	ER_{25}	95%CI	ER_{50}	95%CI	slope	95%CI
Cabbage	100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Corn	100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Lettuce	91-100	0.83	ND	N/A	>0.83	N/A	>0.83	N/A	N/A	N/A
Oilseed Rape	98-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Onion	96-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Ryegrass[1]	0-100	2.5	ND	N/A	3.50	3.10-3.78	4.83	4.52-5.02	N/A	N/A
Soybean	93-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Sugarbeet	94-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Tomato	93-100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A
Wheat	100	7.5	ND	N/A	>7.5	N/A	>7.5	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

[1] Significant decrease in ryegrass survival, inhibition of 100% at the 7.5 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

Plant Injury Index*											
Control	Cabbage	Corn	Lettuce	Oilseed Rape	Onion	Ryegrass	Soybean	Sugarbeet	Tomato	Wheat	Formulation Blank
0-67	0-20	0-40	0-90	0-88	0-38	0-100	0-25	0-84	0-60	0-36	N/A

*0- No effect; 10-30- Slight effect; 40-60- Moderate effect; 70-90- Severe effect; 100 = death of entire plant.

C. VERIFICATION OF STATISTICAL RESULTS BY THE REVIEWER:

All analyses were conducted comparing treated to the negative control. These analyses were conducted using CETIS version 1.8.7.12 and backend settings approved for use by EFED on 10/20/15. Data for each endpoint were tested to determine if their distributions were normal and if their variances were homogeneous using Shapiro-Wilk's and Levene's tests, respectively. Data that satisfied these assumptions were subjected to Dunnett's and William's tests, and data that did not satisfy these assumptions were subjected to the non-parametric Mann-Whitney U and Jonckheere's tests. Linear (emergence and survival) and nonlinear (height and dry weight) regression models were used to interpret ICx values. Measured concentrations were used for all analyses.

Table 6: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for height (lb a.i./A)									
	height (cm)	NOEC	IC_{05}	95%CI	IC_{25}	95%CI	IC_{50}	95%CI	slope	95%CI
Cabbage*	14.5-15.3	7.4	ND	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Corn[1]*	56.5-78.2	2.3	0.91	N/A- 1.99	6.31	3.93-9.49	>7.2	N/A	N/A	N/A
Lettuce*[+]	5.73-8.15	0.84	ND	N/A	>0.84	N/A	>0.84	N/A	N/A	N/A
Oilseed Rape[2]*	16-18.6	0.84	0.328	0.00226- 3.97	>7.4	N/A	>7.4	N/A	N/A	N/A
Onion[3]*	7.59-11.2	2.5	0.721	N/A- 2.84	6.05	1.98-13.8	>7.4	N/A	N/A	N/A
Ryegrass[4]	4.23-18.1	0.23	0.178	N/A- 0.317	0.472	0.278- 0.692	0.928	0.672-1.28	N/A	N/A
Soybean	33.5-36.5	7.2	NC	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Sugarbeet[5]	3.71-15.4	0.27	0.115	0.0532- 0.175	0.548	0.438- 0.672	1.62	1.4-1.89	N/A	N/A
Tomato[6]	7.91-23.7	0.23	0.383	N/A- 0.694	1.53	1-2.19	4.03	3.02-5.36	N/A	N/A
Wheat[7]	45.2-52.7	2.3	NC	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

*Endpoints and/or confidence intervals are outside tested range of concentrations and should be interpreted with caution.

[+] Based on the results of the preliminary non-GLP range-finding test lettuce height and dry weight showed inhibitions in a dose-responsive relationship. However, the definitive study resulted in no effects observed at the tested rates, which included rates used in the definitive study, presenting an uncertainty with the results that were observed in the range-finding study. Lettuce had really high PMSD, ranging from 31 to 55%.

[1] Significant decrease in corn height, inhibition of 26% at the 7.2 lb a.i./A treatment level compared to the negative control (Williams test, $p<0.05$).

[2] Significant decrease in oilseed rape height, inhibition of 14 and 6% at the 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$).

[3] Significant decrease in onion height, inhibition of 32% at the 7.4 lb a.i./A treatment level compared to the negative control (Williams test, $p<0.05$).

[4] Significant decrease in ryegrass height, inhibition of 45 and 77% at the 0.73 and 2.3 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$). There was 100% mortality at the 7.4 lb a.i./A treatment level.

[5] Significant decrease in sugarbeet height, inhibition of 38, 64, and 76% at the 0.84, 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$).

[6] Significant decrease in tomato height, inhibition of 14, 39 and 67% at the 0.73, 2.3 and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$).

[7] Significant decrease in wheat height, inhibition of 14% at the 7.2 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

Table 6a: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for biomass (lb a.i./A)									
	weight (g)	NOEC	IC_{05}	95%CI	IC_{25}	95%CI	IC_{50}	95%CI	slope	95%CI
Cabbage*	0.342-0.404	7.4	NC	N/A- 5.77	>7.4	N/A0	>7.4	N/A	N/A	N/A
Corn[1]	0.918-1.58	2.3	1.68	N/A-3.29	4.53	2.68-6.66	>7.2	N/A	N/A	N/A
Lettuce	0.0913-0.199	0.84	NC	N/A	>0.84[+]	N/A	>0.84	N/A	N/A	N/A
Oilseed Rape[2]	0.628-0.754	0.27	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Onion[3]*	0.00968-0.0156	0.84	0.0568	N/A- 0.568	1.99	0.47-6.18	>7.4	N/A	N/A	N/A
Ryegrass[4]	0.0045-0.035	0.23	0.209	N/A- 0.41	0.484	0.186- 0.801	0.869	0.558- 1.35	N/A	N/A
Soybean	0.97-1.1	7.2	ND	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Sugarbeet[5]	0.0237-0.281	0.27	0.306	N/A- 0.422	0.708	0.561- 0.862	1.27	1.09-1.48	N/A	N/A
Tomato[6]	0.065-0.255	0.23	0.301	N/A- 0.678	1.07	0.479- 1.86	2.57	1.64- 4.04	N/A	N/A
Wheat[7]	0.185-0.3	2.3	2.53	N/A- 4.32	5.64	4.1- 7.26	>7.2	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

*Endpoints and/or confidence intervals are outside tested range of concentrations and should be interpreted with caution.

[1] Significant decrease in corn dry weight, inhibition of 41% at the 7.2 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

[+] Although inhibitions >25% were observed in some concentrations during the test, these were not dose-responsive and the IC_{25} is considered above the highest test concentration. Based on the results of the preliminary non-GLP range-finding test lettuce height and dry weight showed inhibitions in a dose-responsive relationship. However, the definitive study resulted in no effects observed at the tested rates, which included rates used in the definitive study, presenting an uncertainty with the results that were observed in the range-finding study. Lettuce had really high PMSD, ranging from 31 to 55%.

[2] Significant decrease in oilseed rape dry weight, inhibition of 6, 13 and 7% at the 0.84, 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$).

[3] Significant decrease in onion dry weight, inhibition of 25 and 38% at the 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$).

[4] Significant decrease in ryegrass dry weight, inhibition of 50 and 87% at the 0.73 and 2.3 lb a.i./A treatment levels, respectively, compared to the negative control (Dunnett's test, $p<0.05$). There was 100% mortality at the 7.4 lb a.i./A treatment level.

[5] Significant decrease in sugarbeet dry weight, inhibition of 33, 81 and 92% at the 0.84, 2.5 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$).

[6] Significant decrease in tomato dry weight, inhibition of 53 and 74% at the 2.3 and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$). Although not statistically significant, the 0.73 lb a.i./A was considered to also have treatment related effects (14% decrease, compared to negative control) that were narrowly not detected in the statistical test ($p=0.09$). This difference may be attributed to the single poor performing replicate in the control (mean replicate weight of 0.1g), which was lower than any other replicate mean in the other controls or the three lowest treatment concentrations.

[7] Significant decrease in wheat dry weight, inhibition of 38% at the 7.2 lb a.i./A treatment level compared to the negative control (Dunnett's test, $p<0.05$).

Table 6b: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for emergence (lb a.i./A)									
	%	NOEC	IC_{05}	95%CI	IC_{25}	95%CI	IC_{50}	95%CI	slope	95%CI
Cabbage	88-98	7.4	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Corn	93-100	7.2	>7.2	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Lettuce	55-80	0.84	NC	N/A	>0.84[+]	N/A	>0.84	N/A	N/A	N/A
Oilseed Rape	90-100	7.4	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Onion[1]	70-95	0.088	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Ryegrass[2]	3-95	0.23	0.0733	0.0343- 0.122	0.29	0.188- 0.404	0.755	0.554-1.03	1.62	1.26-1.99
Soybean	90-98	7.2	NC	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Sugarbeet	95-98	7.4	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Tomato	85-95	7.2	NC	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Wheat	93-100	7.2	NC	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

[+] Although inhibitions >25% were observed in some concentrations during the test, these were not dose-responsive and the IC_{25} is considered above the highest test concentration. Based on the results of the preliminary non-GLP range-finding test lettuce height and dry weight showed inhibitions in a dose-responsive relationship. However, the definitive study resulted in no effects observed at the tested rates, which included rates used in the definitive study, presenting an uncertainty with the results that were observed in the range-finding study. Lettuce had really high PMSD, ranging from 31 to 55%.

[1] Significant decrease in onion emergence, inhibition of 26, 18, 21 and 24% at the 0.030, 0.27, 0.84 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$). Not dose-responsive. This significance level is partially being driven by the really high control performance (mean 95%, 95%UCL of 100%, low CV, 10%), and the lowest treatment level had two replicates that brought down the mean, one replicate was a low performer (60% emergence), and one replicate with 0% survival. The 95% CI for the lowest treatment level (0.030 lb a.i./A) encompasses the control mean.

[2] Significant decrease in ryegrass emergence, inhibition of 45, 76, and 97% at the 0.73, 2.3, and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$).

Table 6c: Effect of DCPA on 21-Day Seedling Emergence

Species	Results summary for survival (lb a.i./A), based on number planted									
	%	NOEC	IC_{05}	95%CI	IC_{25}	95%CI	IC_{50}	95%CI	slope	95%CI
Cabbage	88-98	7.4	NC	N/A	>7.4	N/A	NC	N/A	N/A	N/A
Corn	93-100	7.2	>7.2	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Lettuce	55-78	0.84	NC	N/A	>0.84	N/A	>0.84	N/A	N/A	N/A
Oilseed Rape	90-98	7.4	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Onion[1]	68-93	2.5	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Ryegrass[2]	0-95	0.23	0.0749	0.0364- 0.122	0.277	0.182- 0.382	0.688	0.51-0.929	1.71	1.33-2.09
Soybean	80-95	7.5	NC	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Sugarbeet	90-95	7.4	NC	N/A	>7.4	N/A	>7.4	N/A	N/A	N/A
Tomato	80-95	7.2	NC	N/A	>7.2	N/A	>7.2	N/A	N/A	N/A
Wheat	93-100	7.2	NC	N/A	>7.2	N/A	NC	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

[+] Based on the results of the preliminary non-GLP range-finding test lettuce height and dry weight showed inhibitions in a dose-responsive relationship. However, the definitive study resulted in no effects observed at the tested rates, which included rates used in the definitive study, presenting an uncertainty with the results that were observed in the range-finding study. Lettuce had really high PMSD, ranging from 31 to 55%.

[1] Significant decrease in onion survival, inhibition of 27, 16, 19 and 22% at the 0.030, 0.27, 0.84 and 7.4 lb a.i./A treatment levels, respectively, compared to the negative control (Mann-Whitney U Two-Sample test, $p<0.05$). Not dose-responsive. This significance level is partially being driven by the really high control performance (mean 93%, 95%UCL of 100%, low CV, 11%), and the lowest treatment level had two replicates

that brought down the mean, one replicate was a low performer (60% emergence), and one replicate with 0% survival. The 95% CI for the lowest treatment level (0.030 lb a.i./A) encompasses the control mean.

[2] Significant decrease in ryegrass survival, inhibition of 50, 76 and 100% at the 0.73, 2.3, and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Williams test, $p<0.05$).

Plant Injury Index*											
Control	Cabbage	Corn	Lettuce	Oilseed Rape	Onion	Ryegrass	Soybean	Sugarbeet	Tomato	Wheat	Formulation Blank
0-67	0-20	0-40	0-90	0-88	0-38	0-100	0-25	0-84	0-60	0-36	N/A

*0- No effect; 10-30- Slight effect; 40-60- Moderate effect; 70-90- Severe effect; 100 = death of entire plant.

Monocot

Most sensitive monocot: Ryegrass, based on survival*

EC_{50}/IC_{50}: 0.688 lb a.i./A 95% C.I.: 0.51-0.929 lb a.i./A
EC_{25}/IC_{25}: 0.277 lb a.i./A 95% C.I.: 0.182-0.382 lb a.i./A
EC_{05}/IC_{05}: 0.0749 lb a.i./A 95% C.I.: 0.0364-0.122 lb a.i./A
NOAEC: 0.23 lb a.i./A
LOAEC: 0.73 lb a.i./A
Slope: 1.71 95% C.I.: 1.33-2.09 lb a.i./A

***Studies are designed to capture sub-lethal effects; therefore, survival is not expected to be the most sensitive endpoint. However, low emergence and low survival in ryegrass at the highest three treatment levels may have confounded growth effects in ryegrass.**

Dicot

Most sensitive dicot: Sugarbeet, based on height

EC_{50}/IC_{50}: 1.62 lb a.i./A 95% C.I.: 1.4-1.89 lb a.i./A
EC_{25}/IC_{25}: 0.548 lb a.i./A 95% C.I.: 0.438-0.672 lb a.i./A
EC_{05}/IC_{05}: 0.115 lb a.i./A 95% C.I.: 0.0532-0.175 lb a.i./A
NOAEC: 0.27 lb a.i./A
LOAEC: 0.84 lb a.i./A
Slope: N/A 95% C.I.: N/A

D. STUDY DEFICIENCIES:

1. Seedling emergence studies are intended to capture sub-lethal effects; therefore, survival is not expected to be the most sensitive endpoint. Survival in ryegrass was the most sensitive endpoint overall the monocot species. There is a strong effect of low emergence and low survival on ryegrass that may have confounded growth effects. The results for ryegrass should be interpreted with caution.
2. The reviewer determined survival based on the number planted; the negative control for survival ranged from 73 to 95% for all species tested. The study author determined survival based on number emerged; the negative control for survival ranged from 93 to 100% for all species tested. The study author's survival results differed from the reviewer's as the study author found no significant inhibitions in survival for any species. If survival is based on number planted, the mean control seedling survival does not meet the OCSPP 850.4100 test validity element of at least 90% survival at test termination for two species, lettuce (73%), and soybean (85%).
3. The study author used 5 seeds per replicate over 8 replicates, which does meet the OCSPP guideline of 40 seeds per treatment level. The study criteria suggest planting 10 seeds per replicate, OCSPP guidance suggests a minimum of 4 seeds per replicate per treatment and a minimum of 40 seeds per treatment, while OECD recommends a minimum of 5 seeds per replicate. This is a minor deficiency.
4. The physico-chemical properties of the test material were not reported. This is a minor deficiency.
5. Soil CEC and % moisture were not reported. This is a minor deficiency.
6. The relative humidity during the study ranged from 16-90% for all species tested. The mean relative humidity for the subset of species tested together: corn, *Zea mays*; wheat, *Triticum aestivum;* soybean, *Glycine max*; ryegrass, *Lolium perenne*; and tomato, *Lycopersicon esculentum* was 66% ± 6%(SD).

The mean relative humidity for the second subset of species tested together: onion, *Allium cepa*; sugarbeet, *Beta vulgaris;* cabbage, *Brassica oleracea*; lettuce, *Lactuca sativa; and* oilseed rape, *Brassica napus* was 55% ± 11%(SD). OCSPP recommends relative humidity of 70% (daytime) ± 15%. This is considered a minor deviation.

7. The temperature during the study ranged from 15 to 36°C for all species tested. The mean temperature for the subset of species tested together: corn, *Zea mays*; wheat, *Triticum aestivum;* soybean, *Glycine max*; ryegrass, *Lolium perenne*; and tomato, *Lycopersicon esculentum* was 26°C ± 2°C (SD). The mean temperature for the second subset of species tested together: onion, *Allium cepa*; sugarbeet, *Beta vulgaris;* cabbage, *Brassica oleracea*; lettuce, *Lactuca sativa; and* oilseed rape, *Brassica napus* was 22°C ± 1°C (SD). OCSPP recommends temperature of 25/20°C (daytime/nighttime) ± 6°C. This is considered a minor deviation.

E. REVIEWER'S COMMENTS:

The reviewer and study author results were in general agreement for dicots, but not for monocots. The study author's most sensitive monocot was ryegrass, based on emergence, with NOAEC and IC_{25} values of 0.28 and 0.55 lb a.i./A, respectively. The reviewer's most sensitive monocot was ryegrass, based on survival, with NOAEC and IC_{25} values of 0.23 and 0.277 lb a.i./A, respectively. The study author's most sensitive dicot was sugarbeet, based on height, with NOAEC and IC_{25} values of 0.28 and 0.46 lb a.i./A, respectively. The reviewer's most sensitive dicot was also sugarbeet, based on height, with NOAEC and IC_{25} values of 0.27 and 0.548 lb a.i./A, respectively.

The difference in monocot endpoints may be the result of the study author basing survival on number emerged, and the reviewer basing survival on number planted and because the study author used ICPIN linear interpolation, while the reviewer used linear regression. Low emergence and low survival in ryegrass at the highest three treatment levels may have confounded growth effects in ryegrass. However, survival in ryegrass was the most sensitive endpoint overall for monocot species, and there was potentially a strong effect of low emergence and low survival on ryegrass at the higher doses that may have confounded growth effects. Ryegrass had a very steep dose-response with low effects (generally <10%, except for height at 13%) at 0.23 lb a.i./A, but with high effects approaching 50% at 0.73 lb a.i./A, so that even though there is some uncertainty with the IC_{25} endpoint, we can be fairly certain that an accurate IC_{25} lies between these two concentrations.

Although not the most sensitive species additional discussions regarding the NOAEC determinations by the reviewer for a monocot and dicot; onion, and tomato, respectively, follows. For onion emergence and survival endpoints, the observed significance levels may partially be driven by really high control performance (mean emergence, 95% and mean survival, 93%, 95%UCL of 100%, low CV, 10-11%, respectively), the lowest dose had two replicates that brought down the mean, one replicate that was a low performer (60% emergence), and one replicate with 0% survival. Additionally, the 95% CI for the lowest application rate (0.030 lb a.i./A) encompasses the control mean. The onion emergence NOAEC/LOAEC was reviewer determined to be 0.088 and 0.27, respectively, and the onion survival NOAEC/LOAEC was also reviewer determined to be 2.3 and 7.4 lb a.i./A, respectively. For tomato significant decreases in dry weight, an inhibition of 53 and 74% at the 2.3 and 7.2 lb a.i./A treatment levels, respectively, compared to the negative control (Jonckheere-Terpstra Step-Down test, $p<0.05$). Although not statistically significant, the 0.73 lb a.i./A was considered to also have treatment related effects (14% decrease, compared to negative control) that were narrowly not detected in the statistical test ($p=0.09$). However, this difference may be attributed to the single poor performing replicate in the control (mean replicate weight of 0.1g), which was lower than any other replicate mean in the other controls or the three lowest treatment concentrations. The tomato dry weight NOAEC/LOEAC was reviewer determined to be 0.23 and 0.73 lb a.i./A, respectively.

Based on the results of the preliminary non-GLP range-finding test using applications of 0.012 to 7.5 lb a.i./A DCPA, lettuce height and dry weight showed inhibitions in a dose-responsive relationship. For lettuce the fresh weight reductions a maximum of 96% were observed; and for height reductions a maximum of 69% were observed. Therefore, based on the results of the non-GLP range-finding the application rates for the lettuce portion of the definitive study were: 0.0037, 0.010, 0.030, 0.088, 0.27, and

0.84 lb a.i./A (lettuce). Although inhibitions >25% were observed in some concentrations during the test, these were not dose-responsive and the IC25 is considered above the highest test concentration for all endpoints, which presented an uncertainty with the results that were observed in the range-finding study. Results were further confounded in the definitive study due the negative control survival for lettuce was 73% (based on number planted) and similarly did not meet validity criteria in the range-finding study as well, as the survival observed in the lettuce negative control there was 83%. The lettuce portion of the study is classified as **supplemental and may be used for risk characterization only.** Additionally, if application rates result in higher estimated exposure concentrations than the concentration tested in the definitive study, additional data may be required for lettuce (only).

The reviewer's results are presented in the Executive Summary and Conclusions sections of this DER.

The in-life portion of this study was initiated on August 20, 2013 and completed on September 10, 2013 for corn, wheat, soybean, tomato, and ryegrass; and initiated on October 8, 2013 and completed on October 29, 2013 for onion, lettuce, oilseed rape, sugarbeet, and cabbage. The original test with the latter species was initiated on September 3, 2013, but was halted after control plants showed damage, apparently as a result of unsuitable greenhouse conditions. Dry weight measurements were completed on October 20, 2013.

F. CONCLUSIONS:

This study is **scientifically sound** and is classified as **acceptable for all species *except ryegrass and lettuce*, for which it is considered supplemental and may be used to calculate risk quotients (*for ryegrass survival endpoint*) and supplemental and may be used for risk characterization only (for *lettuce*).** The most sensitive monocot was ryegrass, based on survival, with NOAEC and IC_{25} values of 0.23 and 0.277 lb a.i./A, respectively. Seedling emergence studies are intended to capture sub-lethal effects; so survival is not expected to be the most sensitive endpoint. However, survival in ryegrass was the most sensitive endpoint overall for monocot species, and there was potentially a strong effect of low emergence and low survival on ryegrass at the higher doses that may have confounded growth effects. Ryegrass had a very steep dose-response with low effects (generally <10%, except for height at 13%) at 0.23 lb a.i./A, but with high effects approaching 50% at 0.73 lb a.i./A, so that even though there is some uncertainty with the IC_{25} endpoint, we can be fairly certain that an accurate IC_{25} lies between these two concentrations. The most sensitive dicot was sugarbeet, based on height, with NOAEC and IC_{25} values of 0.27 and 0.548 lb a.i./A, respectively. If application rates result in higher estimated exposure concentrations than the concentration tested in this study, additional data may be required for lettuce (only).

Most sensitive monocot and IC_{25}: Ryegrass (based on survival), 0.277 lb a.i./A
Most sensitive dicot and IC_{25}: Sugarbeet (based on height), 0.548 lb a.i./A

III. REFERENCES:

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APPENDIX 1. APPLICATION RATE CONVERSIONS from EXCEL FILE

Analysis of Treatment Solutions

	Nominal	Measured		Measured Spray Vol.			Measured	Measured Ave	
	mg ai/L	mg ai/L	mg/g	L/ha	g ai/ha		lb ai/A	lb ai/A	% recoveries
8/21/2013*	518.3	432	1000	200	86.40	0.000892	**0.0771**	**0.078**	83.3
Corn, Wheat,	518.3	437	1000	200	87.40	0.000892	**0.0780**		84.3
Ryegrass,	518.3	436	1000	200	87.20	0.000892	**0.0778**		84.1
Soybean,	1555	1292	1000	200	258.40	0.000892	**0.230**		83.1
Tomato	4665	4092	1000	200	818.40	0.000892	**0.730**		87.7
	13994	13012	1000	200	2602.40	0.000892	**2.32**		93.0
	41983	40900	1000	200	8180.00	0.000892	**7.30**	**7.2**	97.4
	41983	40394	1000	200	8078.80	0.000892	**7.21**		96.2
	41983	40487	1000	200	8097.40	0.000892	**7.22**		96.4

***application was made on 8/20/2013, analysis on 8/20 was not valid due to low spike recovery**

10/8/2013	Nominal	Measured		Measured Spray Vol.			Measured	Measured Ave	
	mg ai/L	mg ai/L	mg/g	L/ha	g ai/ha		lb ai/A	lb ai/A	% recoveries
Onion	19.2	20.2	1000	205	4.14	0.000892	**0.00369**	**0.0037**	105.2
Cabbage,	19.2	20.5	1000	205	4.20	0.000892	**0.00375**		106.8
Oilseed rape,	19.2	20.3	1000	205	4.16	0.000892	**0.00371**		105.7
Lettuce, Sugarbeet	57.6	55.7	1000	205	11.42	0.000892	**0.0102**		96.7
	172.8	165	1000	205	33.83	0.000892	**0.0302**		95.5
	518.3	481	1000	205	98.61	0.000892	**0.0880**		92.8
	1555	1467	1000	205	300.74	0.000892	**0.268**		94.3
	4665	4599	1000	205	942.80	0.000892	**0.841**		98.6
	13994	13500	1000	205	2767.50	0.000892	**2.47**		96.5
	41983	40518	1000	205	8306.19	0.000892	**7.41**		96.5
	41983	41109	1000	205	8427.35	0.000892	**7.52**		97.9
	41983	40503	1000	205	8303.12	0.000892	**7.41**	**7.4**	96.5

	Nominal	Measured		Spray Vol.			Measured		
	mg ai/L	mg ai/L	mg/g	L/ha	g ai/ha		lb ai/A		
LOQ	5		1000	200	1.000	0.000892	**0.00089**		
QC Spikes								% recoveries	
21-Aug-13	460	451	1000	200	90.20	0.000892	**0.080**	98.0	
	46002	45624	1000	200	9124.80	0.000892	**8.14**	99.2	
8-Oct-13	17.3	15.4	1000	200	3.08	0.000892	**0.0027**	89.0	
	46002	45444	1000	200	9088.80	0.000892	**8.11**	98.8	