



<http://www.ir4project.org/about-environmental-horticulture/environmental-horticulture-research-summaries>

IR-4 Ornamental Horticulture Program Sulfosulfuron Crop Safety

**Authors: Cristi L. Palmer and Ely Vea
Date: July 31, 2014**

Acknowledgements

**Kathleen Hester
Lori Harrison
Karen Sims**

Table of Contents

Table of Contents	2
Table of Tables	3
Abstract	4
Introduction.....	5
Materials and Methods.....	5
Results and Summary	5
Phytotoxicity	5
Label Suggestions	19
Appendix 1: Contributing Researchers.....	20
Appendix 2: Submitted Data.....	Error! Bookmark not defined.

Table of Tables

Table 1.	List of Sulfosulfuron treated crops with no or minimal transitory injury.....	6
Table 2.	List of Sulfosulfuron treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity.	6
Table 3.	List of Sulfosulfuron treated crops exhibiting significant injury.....	6
Table 4.	List of Sulfosulfuron treated crops where more information is needed.....	6
Table 5.	Detailed Summary of Crop Safety Testing with Sulfosulfuron.....	7

Abstract

Since 2005 IR-4 has completed 192 trials with sulfosulfuron (Certainty 75WDG) on 79 plant genera or species. The data contained in this report was generated to register uses of sulfosulfuron on and around ornamental horticulture plants with over-the-top applications. The sulfosulfuron rates in the testing programs were 1.25, 2.5 and 5 oz product per acre (0.0586, 0.117, and 0.188 lb ai per acre) as the 1X, 2X and 4X rates. Two plant genera or species exhibited no or minimal transient injury after application at all three rates in 3 trials including *Gleditsia sp.* and *Hibiscus*; however with the latter there may be a cultivar or species sensitivity. Five crops (*Acer rubrum*, *Armeria maritima*, *Gazania sp.*, *Lavandula angustifolia* and *Muhlenbergia capillaris*) exhibited minimal or transient injury at the lowest rate but there was commercially unacceptable injury at the higher rates. For 26 crops, there was significant injury even mortality. For the remaining crops, more trials are needed to determine response.

Introduction

Control of broadleaved weeds and sedges in the production of woody and herbaceous perennials can be problematic because nurseries grow many different types of plants and not all genera or species are listed on labels. These weeds can also be difficult to control in landscape settings for the same reason. IR-4 has undertaken developing crop safety on these and other crops with several herbicides. This summary covers the results from sulfosulfuron from 2009 through 2012.

Materials and Methods

Two applications of sulfosulfuron were made approximately 30 days apart. The application rates were 1.25, 2.5 and 5 oz product per acre (0.0586, 0.117, and 0.2344 lb ai per acre, plus a water treated control. A minimum of four plants (replicate treatments) were required with many researchers exceeding this minimum. Phytotoxicity was recorded on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill) at 1, 2, 4, 8, and 12 weeks after initial application. Some researchers also included readings 3 to 4 days after the initial and second applications. Please visit <http://ir4.rutgers.edu/ornamental/OrnamentalDrafts.cfm> to view and download these protocols.

Sulfosulfuron was supplied to researchers (See list of researchers in Appendix 1) by Monsanto.

Results and Summary

Phytotoxicity

Based on the type and nature of injury seen with sulfosulfuron applications in the conducted research, tested plant species were placed into four categories: 1) no significant phytotoxicity or growth differences from the untreated check or any injury was transitory, 2) no or minimal transitory injury seen at the 1X rate, but the 2X and/or 4X rates did cause significant phytotoxicity, 3) significant injury sufficient to recommend growers not utilize this product, and 4) more data is needed to make informed recommendations.

There were a sufficient number of trials to determine that sulfosulfuron exhibited no or minimal negative impact on three crops (Table 1) including *Ceanothus sp.*, *Gazania sp.*, and *Gleditsia sp.* Some minimal injury may be acceptable for growers if applications are made several weeks to months in advance of crop sale particularly for woody ornamental crops. Three crops (*Armeria maritima*, *Lavandula angustifolia* and *Muhlenbergia capillaris*) exhibited minimal or transient injury at the lowest rate, but there was commercially unacceptable injury at the higher rates (Table 2). For 15 crops, there was significant injury even mortality: *Agastache sp.*, *Asclepias tuberosa*, *Berberis thunbergia*, *Buddleia davidii*, *Clematis sp.*, *Chrysogonum virginianum var. austral*, *Cornus sericea*, *Delphinium sp.*, *Helianthus sp.*, *Juglans nigra*, *Lamium maculatum*, *Pseudotsuga menziesii*, *Quercus alba*, *Ruscus hypophyllum*, and *Viburnum dentate* (Table 3). For 58 genera/species more information is needed either because only 1 or 2 trials were conducted or because consistent results were not achieved among research sites (Table 4). Please see Table 5 for a list of individual trial summaries on Sulfosulfuron.

Table 1. List of Sulfosulfuron treated crops with no or minimal transitory injury.

Gleditsia sp

Hibiscus sp. (No significant injury across species with the exception of ‘Luna Pink Swirl)

Table 2. List of Sulfosulfuron treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity.

Acer rubrum

Gazania sp.

Muhlenbergia capillaris

Armeria maritima

Lavandula angustifolia

Table 3. List of Sulfosulfuron treated crops exhibiting significant injury.

Agastache sp.

Clematis sp.

Lamium maculatum

Asclepias tuberosa

Chrysogonum virginianum

Liatris sp.

Athyrium nipponicum

var. *austral*

Lobelia sp.

Berberis thunbergia

Cornus sericea

Loropetalum sp.

Buddleia davidii

Delphinium sp.

Osmundo regalis

Canna x generalis

Dryopteris erythrosora

Pseudotsuga menziesii

Catharanthus roseus

Helianthus sp.

Quercus alba

Ceanothus maritimus

Juglans nigra

Ruscus hypophyllum

Ceanothus x pallida

Kerria japonica

*Viburnum dentatum*¹

Table 4. List of Sulfosulfuron treated crops where more information is needed.

Abelia grandiflora

Carex divulsa

Paeonia sp.

Abelia sp.

Cedrus atlantica

Philadelphus viginialis

Abies balsamea

Chelone sp.

Pieris japonica

phanorelopsis

Cotoneaster apiculata

Pinus glauca

Abies firma

Cotoneaster horizon

Pinus strobus

Abies fraseri

Crataegus coccinoid

Pinus sylvestris

Acer circinatum

Cryptomeria japonica

Portulaca sp.

Acer negundo

Cupressocyparis leylandii

Quercus rubra

Acer palmatum

Cupressus arizonica

Rosa sp.

Acer tataricum

Fothergilla gardenii

Sabal minor

Aesculus pavia

Helianthemum

Taxodium distichum

Allamanda cathartica

nummularium

Taxus densiformis

Alnus cordata

*Ilex sp.*¹

Ternstroemia sp.

Alnus incana

Illicium sp.

*Thuja occidentalis*¹ (Note:
no injury in 1 trial)

Alnus rhombifolia

Itea virginica

Trachycarpus fortune

Asclepias ericoides

Lagerstroemia indica

Verbena sp.

Aster ericoides

Larix laricina

Viburnum ovabatum

Astilbe sp.

Ligustrum sp.

*densa*¹

Caladium sp.

Magnolia grandiflora

Zelkova serrata

Camellia sp.

Malus domestica

¹ Genera or closely related species already listed on Certainty supplemental label for over the top applications to landscape and nursery ornamentals.

Table 5. Detailed Summary of Crop Safety Testing with Sulfosulfuron.

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 12/31/13 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28532	Abelia (Abelia sp.)	Field Container	Gilliam	AL	2009	Over the top	Moderate injury and growth reduction at 0.059, 0.117, 0.234 lb ai per acre.	20091119g.pdf
28532	Abelia (Abelia sp.) A. grandiflora	Field Container	Mickelbart	IN	2009	Over the top	Unacceptable crop injury with 0.059, 0.117, 0.234 lb ai per acre 3 to 5 WAT and significant reduction in percent growth, height and width 12 WAT.	20101028c.pdf
28532	Abelia (Abelia sp.) A. grandiflora 'Edward Goucher'	Field Container	Trader	MS	2009	Over the top	Very slight injury at 0.059, 0.117, 0.234 lb ai per acre; growth reduction at 4X.	20090924e.pdf
28533	Fir, Fraser (Abies fraseri)	Field Container	Boydston	WA	2010	Over the top	Two applications at 0.06 lb ai per acre caused slight injury while 0.12 and 0.23 lb ai per acre caused significant injury to Fraser fir.	20101130v.pdf
28533	Fir, Fraser (Abies fraseri)	Field Container	Freiberger	NJ	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre after 1st, moderate injury at 2X and 4X after 2nd application.	20100129b.pdf
28534	Fir (Abies sp.) A. balsamea phanerolepis	Field Container	Freiberger	NJ	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28534	Fir (Abies sp.) A. firma	Field Container	Czarnota	GA	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre.	20091214a.pdf
28534	Fir (Abies sp.) A. fraseri	Field Container	Boydston	WA	2009	Over the top	No injury at 0.056, 0.1172 and 0.2344 lb ai per acre after 1st, moderate injury at 2X and 4X after 2nd application; only 1X treated plants saleable.	20091103k.pdf
28535	Box elder (Acer negundo L. ssp. Negundo)	Field Container	Freiberger	NJ	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28536	Maple, Red (Acer rubrum)	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in growth with one or two applications at 0.059, 0.117, 0.234 lb ai per acre.	20110323h.pdf
28536	Maple, Red (Acer rubrum)	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No significant injury or growth reduction with 0.058, 0.117 and 0.235 lb ai per acre applied twice; no reduction in plant marketability.	20120809f.pdf
28536	Maple, Red (Acer rubrum)	Field Container	Freiberger	NJ	2009	Over the top	Slight to moderate injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28537	Maple (Acer sp.) A. circinatum	Field Container	DeFrancesco	OR	2011	Over the top	No injury with 1.25, 2.5 and 5 oz per acre applied twice; no growth reduction.	20121002a.pdf
28537	Maple (Acer sp.) A. ginnala 'Flame'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	Overall, minor crop injury with all three rates (0.059, 0.117, 1.5 lb ai per acre) but marketable. All treated pots had growth reduction but not significant at 1 and 2x while 4x had 50% reduction.	20110426a.pdf
28537	Maple (Acer sp.) A. palmatum	Field Container	Mathers	OH	2010	Over the top	No crop injury at 0.059, 0.117, and 0.234 lb ai per acre.	20101005a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28537	Maple (Acer sp.) A. rubrum	Field Container	Derr	VA	2010	Over the top	Slight (10-20%) decrease in growth index 46 DAT with 0.059, 0.117, 0.234 lb ai per acre. Effective control of annual sedge but not crabgrass.	20101104g.pdf
28538	Horse Chestnut (Aesculus sp.) A. pavia	Field Container	Freiberger	NJ	2009	Over the top	Moderate injury at 0.059, high at 0.117, 0.234 lb ai per acre.	20100129b.pdf
28539	Hyssop species (Agastache sp.) Agastache sp. 'Black Adder'	Field Container	Mathers	OH	2010	Over the top	Moderate to severe injury at 0.059, 0.117, and 0.234 lb ai per acre.	20101005a.pdf
28539	Hyssop species (Agastache sp.) 'Black Adder'	Field Container	Trader	MS	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre; growth reduction at 2X and 4X.	20090924e.pdf
28539	Hyssop species (Agastache sp.) 'Blue Fortune'	Field Container	Boydston	WA	2009	Over the top	Severe injury at 0.06, 0.12 and 0.23 lb ai per acre.	20091201c.pdf
28539	Hyssop species (Agastache sp.) 'Blue Fortune'	Field Container	Boydston	WA	2010	Over the top	Moderate to severe injury increasing with rates (0.06, 0.12 and 0.23 lb ai per acre); plants at 2X and 4X not saleable.	20101130w.pdf
28540	Golden Trumpet (Allamanda sp.) A. cathartica 'Hendersonii'	Field Container	Stamps	FL	2009	Over the top	Moderate to high injury increasing with rates (0.059, 0.117, 0.234 lb ai per acre); no significant growth reduction.	20100301a.pdf
28541	Alder (Alnus sp.) A. cordata	Field Container	Freiberger	NJ	2009	Over the top	Severe injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28541	Alder (Alnus sp.) A. incana (L.) Moench	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in growth with one or two applications at 0.059, 0.117, 0.234 lb ai per acre. Effective control of prostrate pigweed.	20110323i.pdf
28541	Alder (Alnus sp.) A. rhombifolia	Field Container	DeFrancesco	OR	2011	Over the top	Slight injury with quick recovery after 1st application with 1.25, 2.5 and 5 oz per acre; no injury after 2nd application; no growth reduction.	20121002a.pdf
28549	Thrift, Sea Pink (Armeria maritima) 'Rubrifolia'	Field Container	Klett	CO	2009	Over the top	Trial 1: Visual injury (light reddish tan foliage, stunting) at 0.059, 0.117, 0.234 lb ai per acre.	20100109a.pdf
28549	Thrift, Sea Pink (Armeria maritima) 'Rubrifolia'	Field Container	Klett	CO	2009	Over the top	Trial 2: Visual injury (light reddish tan foliage, stunting) at 0.059, 0.117, 0.234 lb ai per acre.	20100109a.pdf
28549	Thrift, Sea Pink (Armeria maritima) 'Splendens'	Field Container	Senesac	NY	2009	Over the top	Moderate injury at 0.059, severe at 0.117 and 0.234 lb ai per acre.	20091130d.pdf
28549	Thrift, Sea Pink (Armeria maritima) 'Splendens'	Field Container	Trader	MS	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre; growth reduction at 4X.	20090924e.pdf
28551	Butterfly Flower (Asclepias sp.) A. sp.	Field Container	Derr	VA	2010	Over the top	Moderate injury decreasing over time with 0.059, 0.117, 0.234 lb ai per acre 62 DAT and 14 DAT2. Increasing control of longstalked phyllanthus and tasselflower with increasing rates. No control of s. crabgrass at any rate.	20100929a.pdf
28551	Butterfly Flower (Asclepias sp.) A. tuberosa	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in growth with one or two applications at 0.059, 0.117, 0.234 lb ai per acre. Effective control of prostrate pigweed.	20110503a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28551	Butterfly Flower (<i>Asclepias</i> sp.) <i>A. tuberosa</i>	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	Significant injury and reduction of growth and flower number with 0.058, 0.117 and 0.235 lb ai per acre applied twice; plants not marketable.	20120809g.pdf
28551	Butterfly Flower (<i>Asclepias</i> sp.) <i>A. tuberosa</i>	Field Container	Trader	MS	2009	Over the top	Severe injury and growth reduction at 0.059, 0.117, 0.234 lb ai per acre.	20090924e.pdf
28553	Aster (<i>Aster ericoides</i>) <i>A. ericoidees</i> 'Woods Pink'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	Transient phytotoxicity and stunting with 0.117 and 0.234 lb ai per acre (no injury with 0.059 lb ai per acre) and all plants marketable.	20110503b.pdf
28553	Aster (<i>Aster ericoides</i>) 'Snow Flurry'	Field Container	Senesac	NY	2009	Over the top	No injury at 0.059, 0.117 and 0.234 lb ai per acre after 1st, slight injury at 2X and 4X after 2nd application.	20091130d.pdf
28554	False Spirea (<i>Astilbe</i> sp.)	Field Container	Boydston	WA	2009	Over the top	Moderate to high injury increasing with rates (0.06, 0.12 and 0.23 lb ai per acre).	20091201d.pdf
28554	False Spirea (<i>Astilbe</i> sp.) <i>A. 'Autumn Light'</i>	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	Unacceptable crop injury and growth reduction with second application at 0.117, 0.234 lb ai per acre.	20110323j.pdf
28554	False Spirea (<i>Astilbe</i> sp.) <i>A. chinensis</i> 'Pumila'	Field Container	Senesac	NY	2010	Over the top	Moderate to severe crop injury with 0.059, 0.117, and 0.234 lb ai per acre.	20101129f.pdf
28554	False Spirea (<i>Astilbe</i> sp.) <i>A. xarensii</i> 'Bridal Veil'	Field Container	Mathers	OH	2010	Over the top	Unacceptable crop injury at 0.059 - 0.234 lb ai per acre.	20101005a.pdf
28554	False Spirea (<i>Astilbe</i> sp.) <i>A. xarensii</i> 'Final'	Field Container	Mathers	OH	2010	Over the top	Unacceptable crop injury at 0.059 - 0.234 lb ai per acre.	20101005a.pdf
28554	False Spirea (<i>Astilbe</i> sp.) 'Rhineland'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, slight at 0.117, 0.234 lb ai per acre.	20091214a.pdf
31341	Fern, Lady (<i>Athyrium nipponicum</i>) <i>A. 'Japanese Painted fern'</i>	Field Container	Derr	VA	2011	Over the top	Significant crop injury (63%) and dramatic reduction in fresh shoot weight with 0.059, 0.117, 0.234 lb ai per acre.	20120321b.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. 'Crimson pygmy'</i>	Field Container	Mathers	MI	2010	Over the top	Lincoln: Severe injury and mortality at 0.059, 0.117, and 0.234 lb ai per acre.	20101011c.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. 'Crimson pygmy'</i>	Field Container	Mathers	MI	2010	Over the top	Spring Meadow: Severe injury and mortality at 0.059, 0.117, and 0.234 lb ai per acre.	20101011c.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. 'Crimson pygmy'</i>	Field Container	Mathers	MI	2010	Over the top	Zelenka: Moderate to severe injury at 0.059, 0.117, and 0.234 lb ai per acre.	20101011a.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. thunbergia atropurpureum</i> 'Crimson Pygmy'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	Unacceptable crop injury and growth reduction with all rates (0.059, 0.117, 0.234 lb ai per acre); no plants marketable.	20110323k.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. thunbergii</i>	Field Container	Freiberger	NJ	2009	Over the top	Moderate to high injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. thunbergii</i> 'Crimson pygmy'	Field Container	Mathers	OH	2010	Over the top	Ohio: Severe injury increasing with rate (0.059, 0.117, and 0.234 lb ai per acre).	20101005a.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. thunbergii</i>	Field Container	Chandran	WV	2010	Over the top	No crop injury with two sequential applications at 1.25, 2.5, 5.0 oz/A.	20120308a.pdf
28555	Barberry (<i>Berberis</i> sp.) <i>B. x gladwynsis</i> 'William Penn'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, moderate at 0.117, 0.234 lb ai per acre.	20091214a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28556	Butterfly Bush (Buddleia davidii)	Field Container	Chandran	WV	2010	Over the top	No crop injury with two sequential applications at 1.25, 2.5, 5.0 oz/A.	20120308a.pdf
28556	Butterfly Bush (Buddleia davidii)	Field Container	Freiberger	NJ	2009	Over the top	Severe injury and plant death at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28556	Butterfly Bush (Buddleia davidii) B. 'Adonis Blue'	Field Container	Mathers	MI	2010	Over the top	Spring Meadow: Moderate to severe injury at 0.059, 0.117, and 0.234 lb ai per acre.	20101011c.pdf
28556	Butterfly Bush (Buddleia davidii) B. 'Black Night'	Field Container	Mathers	OH	2010	Over the top	Ohio: Moderate to severe injury increasing with rate (0.059, 0.117, 0.234 lb ai per acre).	20101005a.pdf
28556	Butterfly Bush (Buddleia davidii) B. 'Black Night'	Field Container	Mathers	MI	2010	Over the top	Zelenka: Moderate crop injury at 0.059, 0.117, and 0.234 lb ai per acre.	20101011a.pdf
28556	Butterfly Bush (Buddleia davidii) B. japonica 'Petite Plum'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, slight at 0.117, 0.234 lb ai per acre	20091214a.pdf
28556	Butterfly Bush (Buddleia davidii) B. 'Nanho White'	Field Container	Derr	VA	2010	Over the top	Temporary injury (10%) observed 5 DAT with 0.059, 0.117, 0.234 lb ai per acre. Effective control of annual sedge but not crabgrass.	20101104g.pdf
28556	Butterfly Bush (Buddleia davidii) 'Black Knight'	Field Container	Boydston	WA	2010	Over the top	Moderate to high injury and stunting increasing with rates (0.06, 0.12 and 0.23 lb ai per acre).	20101130x.pdf
28556	Butterfly Bush (Buddleia davidii) 'Black Knight'	Field Container	Uber	CA	2009	Over the top	Slight injury at 0.059, 0.117 lb ai per acre, moderate at 0.234 lb ai per acre.	20100406a.pdf
28556	Butterfly Bush (Buddleia davidii) 'Royal Red'	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	Significant injury with 0.058, 0.117 and 0.235 lb ai per acre after 1st application, good recovery after 2nd application; growth reduction and lower flower number at all rates; reduction in marketability commercially acceptable.	20120809h.pdf
28557	Elephant's-Ear, Angel-Wings (Caladium sp.) C. 'Florida Cardinal'	Field Container	Derr	VA	2010	Over the top	No crop injury with 0.059, 0.117, 0.234 lb ai per acre 62 DAT and 14 DAT2. Increasing control of longstalked phyllanthus and tasselflower with increasing rates. No control of s. crabgrass at any rate.	20100929a.pdf
28561	Camellia (Camellia sp.) C. japonica 'Springs Promise'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	Unacceptable crop injury and growth reduction with all rates (0.059, 0.117, 0.234 lb ai per acre); no plants marketable. Effective yellow woodsorrel, sowthistle and prickly lettuce control.	20110323l.pdf
28561	Camellia (Camellia sp.) C. vernalis 'Yuletide'	Field Container	Gilliam	AL	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre; growth reduction at 1X and 2X.	20091119g.pdf
28561	Camellia (Camellia sp.) 'Winter Snowman'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre.	20091214a.pdf
28562	Canna (Canna sp.) C. 'Blushing Bride'	Field Container	Gilliam	AL	2011	Over the top	Trial 2: All rates were significantly injured with injury increasing with rate (1.25, 2.5, and 5.0 oz/A) and complete mortality by 4WAT.	20111206a.pdf
28562	Canna (Canna sp.) C. spp.	Field Container	Gilliam	AL	2011	Over the top	Trial 1: All rates were significantly injured with injury increasing with rate (1.25, 2.5, and 5.0 oz/A) and complete mortality by 4WAT.	20111206a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28562	Canna (Canna sp.) C. x generalis 'Ermine'	Field Container	Stamps	FL	2009	Over the top	Moderate to high injury increasing with rates (0.059, 0.117, 0.234 lb ai per acre); no significant growth reduction.	20100301a.pdf
28562	Canna (Canna sp.) 'Freckle Face'	Field Container	Derr	VA	2011	Over the top	One application at .059, 0.117, 0.234 lb ai per acre caused unacceptable injury. Decrease height and flower production at 4X. Second application not made due to injury.	20120307a.pdf
28708	Grassland Sedge (Carex divulsa)	Field Container	Boydston	WA	2010	Over the top	Two sequential applications at 0.06, 0.12, and 0.23 lb ai per acre significantly injured and stunted growth of sedge plants; no treated plants were saleable.	20101105t.pdf
28563	Rose Periwinkle (Catharanthus roseus)	Field Container	Lieth	CA	2012	Over the top	Severe injury and growth reduction with 1.25, 2.5 and 5 oz per acre applied twice.	20130226a.pdf
28563	Rose Periwinkle (Catharanthus roseus) C. roseus 'Titan Punch'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in growth with one or two applications at 0.059, 0.117, 0.234 lb ai per acre.	20110323m.pdf
28563	Rose Periwinkle (Catharanthus roseus) 'Titan White'	Field Container	Trader	MS	2009	Over the top	Slight injury with quick recovery at 0.059, 0.117, 0.234 lb ai per acre; no growth reduction.	20090924e.pdf
28563	Rose Periwinkle (Catharanthus roseus) 'Vinca Titan Polka Dot'	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	Slight injury with 0.058 and 0.117, moderate with 0.235 lb ai per acre applied twice, with complete recovery. Growth reduction and reduced marketability only with 4X.	20120827a.pdf
28732	Ceanothus, maritime (Ceanothus maritimus)	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.059, 0.117 and 0.234 lb ai per acre; all treated plants saleable.	20110113c.pdf
28732	Ceanothus, maritime (Ceanothus maritimus)	Field Container	Lieth	CA	2011	Over the top	No injury or growth reduction with 0.059, 0.117 and 0.234 lb ai per acre applied twice.	20130130e.pdf
28732	Ceanothus, maritime (Ceanothus maritimus) C. maritimus 'Dark Star'	Field Container	Wilen	CA	2010	Over the top	Unacceptable crop injury and stunting increasing over time with one and two applications at 0.059, 0.117, 0.234 lb ai per acre.	20110205c.pdf
28564	Ceanothus sp. (Ceanothus sp.) C. victoria	Field Container	Uber	CA	2009	Over the top	No injury at 0.059 lb ai per acre, slight at 0.117, 0.234 lb ai per acre.	20100406a.pdf
28736	Ceanothus (Ceanothus x pallida)	Field Container	Lieth	CA	2011	Over the top	Severe injury and growth reduction with 0.059, 0.117 and 0.234 lb ai per acre applied twice.	20130130e.pdf
28736	Ceanothus (Ceanothus x pallida) 'Marie Simon'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.059, 0.117 and 0.234 lb ai per acre; all treated plants saleable.	20110113c.pdf
28565	Cedar, Atlas (Cedrus atlantica)	Field Container	Freiberger	NJ	2009	Over the top	Slight injury at 0.059, moderate at 0.117, 0.234 lb ai per acre.	20100129b.pdf
28568	Turtlehead, Snakehead (Chelone sp.) 'Hot Lips'	Field Container	Senesac	NY	2009	Over the top	Moderate injury at 0.059, 0.117 and 0.234 lb ai per acre.	20091130d.pdf
28570	Golden Star (Chrysogonum sp.) C. virginianum var. australe	Field Container	Senesac	NY	2009	Over the top	Severe injury at 0.059, 0.117 and 0.234 lb ai per acre.	20091130d.pdf
28573	Clematis (Clematis sp.) C. integrifolia	Field Container	Klett	CO	2009	Over the top	Trial 1: Severe injury including mortality and growth reduction at 0.059, 0.117, 0.234 lb ai per acre	20100109a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28573	Clematis (Clematis sp.) C. integrifolia	Field Container	Klett	CO	2009	Over the top	Trial 2: Severe injury including mortality and growth reduction at 0.059, 0.117, 0.234 lb ai per acre	20100109a.pdf
28573	Clematis (Clematis sp.) 'Ramona'	Field Container	Stamps	FL	2009	Over the top	Severe injury at 0.94, 1.88 and 3.75 oz per acre; no significant growth reduction.	20100301a.pdf
28576	Bunchberry (Cornus canadensis)	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	Slight crop injury with 0.234 lb ai per acre however all plants were subject to sunscald. No significant differences with 0.059 and 0.117 lb ai per acre)	20110331a.pdf
28577	Dogwood, Red Osier (Cornus sericea)	Field Container	Freiberger	NJ	2009	Over the top	Severe injury and plant death at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28577	Dogwood, Red Osier (Cornus sericea) C. 'Cardinal'	Field Container	Mathers	OH	2011	Over the top	Significant crop injury and reduced plant width with two applications at 0.006, 0.12, 0.123 lb ai per acre. Most of 2X and 4X plants died.	20120302b.pdf
28577	Dogwood, Red Osier (Cornus sericea) C. 'Red Osier'	Field Container	Boydston	WA	2011	Over the top	Slight to significant crop injury and reduced plant width with two applications at 0.006, 0.12, 0.123 lb ai per acre. Half of 2x plant saleable, none of 4x plants saleable.	20111012g.pdf
28578	Pampas Grass (Cortaderia sp.) C. selloana	Field Container	Neal	NC	2010	Over the top	Significant crop injury at 2x and 4x (0.117 and 0.234 lb ai per acre) and inhibition of root growth. No injury at 0.08 lb ai per acre.	20110308e.pdf
28580	Cotoneaster (Cotoneaster sp.) C. apiculata	Field Container	Mathers	OH	2009	Over the top	No injury at 0.06, 0.12 and 0.24 lb ai per acre after 1st, unacceptable injury after 2nd application.	20091028b.pdf
28580	Cotoneaster (Cotoneaster sp.) C. horizon	Field Container	Freiberger	NJ	2009	Over the top	Slight injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28581	Hawthorn (Crataegus sp.) C. coccinoid	Field Container	Freiberger	NJ	2009	Over the top	Moderate injury at 0.059, 0.117 lb ai per acre, high at 0.234 lb ai per acre.	20100129b.pdf
28582	Japanese Cedar (Cryptomeria japonica) C. japonica	Field Container	Mickelbart	MI	2009	Over the top	Unacceptable crop injury with 0.059, 0.117, 0.234 lb ai per acre 3 to 6 WAT and significant reduction in % growth, height and width 12 WAT compared to untreated.	20101028c.pdf
28582	Japanese Cedar (Cryptomeria japonica) 'Yoshino'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre	20091214a.pdf
28583	Cypress, Leyland (Cupressocyparis leylandii)	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre	20091214a.pdf
28584	Cypress (Cupressus sp.) C. arizonica 'Carolina Sapphire'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre	20091214a.pdf
28585	Larkspur (Delphinium sp.)	Field Container	Boydston	WA	2010	Over the top	Two sequential applications of Sulfosulfuron 75WG applied 6 weeks apart at 0.06, 0.12, and 0.23 lb ai per acre significantly injured and stunted growth on delphinium plants. No treated plants were saleable.	20101105p.pdf
28585	Larkspur (Delphinium sp.) 'Butterfly Compactum'	Field Container	Boydston	WA	2009	Over the top	No significant injury at 0.06, slight at 0.12 and moderate at 0.23 lb ai per acre.	20091201e.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28585	Larkspur (Delphinium sp.) D. 'Connecticut yankee'	Field Container	Mathers	OH	2010	Over the top	Unacceptable crop injury at 0.059 - 0.234 lb ai per acre.	20101005a.pdf
28585	Larkspur (Delphinium sp.) D. grandiflorum 'Blue Mirror'	Field Container	Senesac	NY	2010	Over the top	Moderate crop injury with one application and severe crop injury with two application at 0.059, 0.117, and 0.234.	20101129f.pdf
28588	Fern, Autumn (Dryopteris erythrosora) 'Brilliance'	Field Container	Stamps	FL	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre; significant growth reduction.	20100301a.pdf
28588	Fern, Autumn (Dryopteris erythrosora) D. 'Autumn Brilliance'	Field Container	Derr	VA	2011	Over the top	Unacceptable injury and shoot weight reduction with all rates (0.059, 0.117, 0.234 lb ai per acre). Good control of groundsel but not tassleflower.	20120321b.pdf
28588	Fern, Autumn (Dryopteris erythrosora) D. 'Brilliance'	Field Container	Gilliam	AL	2011	Over the top	Crop injury (stunting) and growth reduction by approximately half at 4WAT when treated with 1.25, 2.5, and 5.0 oz/A.	20111206a.pdf
28589	Fern, Southern Shield (Dryopteris ludoviciana) D. 'S. Shield fern'	Field Container	Derr	VA	2011	Over the top	Dramatic reduction in shoot weight with 0.059, 0.117, 0.234 lb ai per acre and minor to moderate crop injury increasing with rate. Good groundsel control but not tassleflower.	20120321b.pdf
28591	Plume Grass; Ravenna (Erianthus sp.) E. ravennae	Field Container	Mickelbart	IN	2009	Over the top	Unacceptable crop injury with 0.059, 0.117, 0.234 lb ai per acre 3 to 6 WAT leading to mortality.	20101028c.pdf
28591	Plume Grass; Ravenna (Erianthus sp.) E. sp. a.aka. Saccharum ravennae	Field Container	Neal	NC	2010	Over the top	Significant crop injury with all rates (0.059, 0.117, 0.234 lb ai per acre) increasing with dose suggest not safe for container label.	20110308e.pdf
28594	Witch Alder (Fothergilla gardenii) F. hybrid 'Mt. Airy'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, slight injury with complete recovery at 0.117, 0.234 lb ai per acre	20091214a.pdf
28594	Witch Alder (Fothergilla gardenii) F. hybrid 'Mt. Airy'	Field Container	Mickelbart	MI	2011	Over the top	No significant injury at 0.059 lb ai per acre , significant injury at 0.117, 0.234 lb ai per acre but no height differences and all plants saleable.	20111003a.pdf
28596	Treasure Flower (Gazania sp.)	Field Container	Lieth	CA	2012	Over the top	Severe injury and growth reduction with 1.25, 2.5 and 5 oz per acre applied twice.	20130226a.pdf
28596	Treasure Flower (Gazania sp.) G. 'Kiss Mix'	Field Container	Derr	VA	2010	Over the top	No visible count injury but flower count decreased with increasing rates (0.059, 0.117, 0.234 lb ai per acre) at 20DAT but not at later rating dates.	20101104f.pdf
28596	Treasure Flower (Gazania sp.) G. rigens Gaertn.	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in flower number with one or two applications at 0.059, 0.117, 0.234 lb ai per acre.	20110503c.pdf
28596	Treasure Flower (Gazania sp.) 'Kiss Lemon Shades'	Field Container	Senesac	NY	2009	Over the top	No injury at 0.059, slight with complete recovery at 0.117 and 0.234 lb ai per acre.	20091130d.pdf
28598	Corn Flag, Sword Lily (Gladiolus sp.) G. 'Kings Gold'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	Significant crop injury and height reduction with all rates (0.059, 0.117, 0.234 lb ai per acre). None marketable.	20110323o.pdf
28599	Honey Locust (Gleditsia sp.) G. internis	Field Container	Freiberger	NJ	2009	Over the top	Slight injury at 0.059, moderate at 0.117, 0.234 lb ai per acre.	20100129b.pdf
28599	Honey Locust (Gleditsia sp.) G. triacanthos 'Inermis'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	All plants treated with 0.059, 0.117 or 0.234 lb ai per acre were significantly shorter than untreated but all plants were marketable.	20110323p.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28599	Honey Locust (<i>Gleditsia</i> sp.) <i>Gleditsia triacanthos</i>	Field Container	Mathers	OH	2009	Over the top	Acceptable injury at 0.06, 0.12 and 0.24 lb ai per acre after 1st, no injury after 2nd application; no growth reduction.	20091028d.pdf
28600	Sun Rose, Rock Rose (<i>Helianthemum</i> sp.) H. nummularium 'Hartswood Ruby'	Field Container	Klett	CO	2011	Over the top	Trial 1: No crop injury or reduction in growth with 1.25, 2.5, 5.0 lb ai per acre.	20111209d.pdf
28600	Sun Rose, Rock Rose (<i>Helianthemum</i> sp.) H. nummularium 'Hartswood Ruby'	Field Container	Klett	CO	2011	Over the top	Trial 2: No crop injury or reduction in growth with 1.25, 2.5, 5.0 lb ai per acre.	20111209d.pdf
28601	Sunflower (<i>Helianthus</i> sp.) 'Lemon Queen'	Field Container	Senesac	NY	2009	Over the top	Moderate to severe injury including mortality increasing with rate (0.059, 0.117, 0.234 lb ai per acre).	20091130d.pdf
28601	Sunflower (<i>Helianthus</i> sp.) 'Table Mountain'	Field Container	Trader	MS	2009	Over the top	Severe injury at 0.059, 0.117, 0.234 lb ai per acre.	20090924e.pdf
28605	Mallow, Rose Mallow (<i>Hibiscus</i> sp.) H. 'Luna Pink Swirl'	Field Container	Boydston	WA	2011	Over the top	No reduction in growth with two sequential applications at 0.06, 0.12, and 0.23 lb ai per acre but minor to moderate injury which decreased by 6WAT2. All plants saleable.	20111201b.pdf
28605	Mallow, Rose Mallow (<i>Hibiscus</i> sp.) H. moscheuto 'Luna Blush'	Field Container	Senesac	NY	2010	Over the top	Moderate to severe crop injury with 0.059, 0.117, and 0.234 lb ai per acre.	20101129f.pdf
28605	Mallow, Rose Mallow (<i>Hibiscus</i> sp.) H. rosa-sinensis 'Butterfly Yellow'	Field Container	Uber	CA	2010	Over the top	No significant injury at 0.059, 0.117 lb ai per acre, slight at 0.234 lb ai per acre; no growth reduction. Excellent efficacy on spotted spurge and hairy bittercress.	20101228a.pdf
28605	Mallow, Rose Mallow (<i>Hibiscus</i> sp.) H. rosa-sinensis 'Fire-N-Ice'	Field Container	Stamps	FL	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre; no significant growth reduction.	20100301a.pdf
28605	Mallow, Rose Mallow (<i>Hibiscus</i> sp.) H. syriacus 'Blue Satin'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.059, 0.117 and 0.234 lb ai per acre; all treated plants saleable.	20110113c.pdf
28614	Virginia Sweetspire (<i>Itea virginica</i>)	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No significant injury or reduction of growth and flower number with 0.058, 0.117 and 0.235 lb ai per acre applied twice; no reduction in marketability.	20120809i.pdf
28614	Virginia Sweetspire (<i>Itea virginica</i>) 'Henry's Garnet'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre.	20091214a.pdf
28614	Virginia Sweetspire (<i>Itea virginica</i>) 'Merlot'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.059, 0.117 and 0.234 lb ai per acre; all treated plants saleable.	20110113c.pdf
28615	Walnut, Black (Non-Bearing) (<i>Juglans nigra</i>)	Field Container	Freiberger	NJ	2009	Over the top	Severe injury to mortality increasing with rate (0.059, 0.117, 0.234 lb ai per acre).	20100129b.pdf
28617	Japanese Kerria, Japanese Rose (<i>Kerria japonica</i>) 'Golden Guinea'	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No injury with 0.058 and 0.117, moderate with 0.235 lb ai per acre, applied twice; reduced growth and flower number at all rates; some reduction in plant marketability; additional studies needed.	20120809j.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28617	Japanese Kerria, Japanese Rose (Kerria japonica) K. japonica	Field Container	Mickelbart	IN	2009	Over the top	Unacceptable crop injury with 0.059, 0.117, 0.234 lb ai per acre 3 to 6 WAT and significant reduction in % growth, height and width 12 WAT compared to untreated.	20101028c.pdf
28617	Japanese Kerria, Japanese Rose (Kerria japonica) K. 'Pleniflora'	Field Container	Senesac	NY	2010	Over the top	Minor crop injury with two applications at 0.059, and moderate injury with 0.117 and 0.234 lb aia.	20111107c.pdf
28619	Dead Nettle (Lamium sp.) L. maculatum 'Orchid Frost'	Field Container	Klett	CO	2009	Over the top	Trial 1: Severe injury including mortality and growth reduction at 0.059, 0.117, 0.234 lb ai per acre.	20100109a.pdf
28619	Dead Nettle (Lamium sp.) L. maculatum 'Orchid Frost'	Field Container	Klett	CO	2009	Over the top	Trial 2: Moderate to severe injury and growth reduction increasing with rate (0.059, 0.117, 0.234 lb ai per acre).	20100109a.pdf
28619	Dead Nettle (Lamium sp.) L. maculatum 'Red Nancy'	Field Container	Boydston	WA	2010	Over the top	No injury at 0.06, 0.12 and 0.23 lb ai per acre; all treated plants saleable.	20101130y.pdf
28619	Dead Nettle (Lamium sp.) 'White Nancy'	Field Container	Senesac	NY	2009	Over the top	Slight injury at 0.059, moderate at 0.117 and 0.234 lb ai per acre.	20091130d.pdf
28620	Larch (Larix sp.) L. laricina	Field Container	Freiberger	NJ	2009	Over the top	Slight injury at 0.059, moderate at 0.117, 0.234 lb ai per acre.	20100129b.pdf
28621	Lavender (Lavandula sp.) L. angustifolia 'Hicote Blue'	Field Container	Klett	CO	2009	Over the top	Trial 1: Slight to severe injury (chlorosis) and growth reduction increasing with rates (0.059, 0.117, 0.234 lb ai per acre).	20100109a.pdf
28621	Lavender (Lavandula sp.) L. angustifolia 'Hicote Blue'	Field Container	Klett	CO	2009	Over the top	Trial 2; Slight to severe injury (chlorosis) and growth reduction increasing with rates (0.059, 0.117, 0.234 lb ai per acre).	20100109a.pdf
28621	Lavender (Lavandula sp.) L. angustifolia 'Hidcote'	Field Container	Boydston	WA	2009	Over the top	No injury at 0.06, slight at 0.12 and moderate at 0.23 lb ai per acre.	20091201f.pdf
28621	Lavender (Lavandula sp.) L. angustifolia 'Munstead'	Field Container	Trader	MS	2009	Over the top	Severe injury including mortality at 0.059, 0.117, 0.234 lb ai per acre.	20090924e.pdf
28625	Blazing-Star, Gayfeather (Liatris sp.)	Field Container	Klett	CO	2011	Over the top	Trial 1: Significant crop injury and reduction in growth compared to the weed control in plants treated with 1.25, 2.5, 5.0 lb ai per acre.	20111209d.pdf
28625	Blazing-Star, Gayfeather (Liatris sp.)	Field Container	Klett	CO	2011	Over the top	Trial 2: Significant crop injury and reduction in growth compared to the weed control in plants treated with 1.25, 2.5, 5.0 lb ai per acre.	20111209d.pdf
28626	Privet (Ligustrum sp.)	Field Container	Gilliam	AL	2009	Over the top	No injury and growth reduction at 0.059, 0.117, 0.234 lb ai per acre.	20091119g.pdf
28626	Privet (Ligustrum sp.) L. vulgare	Field Container	Freiberger	NJ	2009	Over the top	Moderate injury at 0.059, 0.117 lb ai per acre, high at 0.234 lb ai per acre.	20100129b.pdf
28627	Lobelia (Lobelia sp.)	Field Container	Lieth	CA	2012	Over the top	Moderate injury and severe growth reduction with 1.25, 2.5 and 5 oz per acre applied twice.	20130226a.pdf
28627	Lobelia (Lobelia sp.) L. cardinalis	Field Container	Senesac	NY	2009	Over the top	Slight injury at 0.059 and 0.117, moderate at 0.234 lb ai per acre.	20091130d.pdf
28627	Lobelia (Lobelia sp.) L. fulgens 'Queen Victoria'	Field Container	Boydston	WA	2010	Over the top	Moderate to severe injury increasing with rates (0.06, 0.12 and 0.23 lb ai per acre).	20101130z.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28629	Loropetalum (Loropetalum sp.) L. chinense rubrum	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre.	20091214a.pdf
28629	Loropetalum (Loropetalum sp.) L. chinensis 'Ruby'	Field Container	Gilliam	AL	2010	Over the top	Moderate crop injury with second application at 0.117 and 0.234 lb ai per acre and slight decrease in size. No differences observed with 0.059 lb ai per acre	20110623b.pdf
28629	Loropetalum (Loropetalum sp.) 'Purple Diamond'	Field Container	Gilliam	AL	2009	Over the top	Minor to moderate injury at 0.059, 0.117, 0.234 lb ai per acre after 2nd application with complete recovery by 16 WAT; growth reduction at 4X.	20091119g.pdf
28632	Apple & Crabapple (Non-Bearing) (Malus sp.) M. domestica	Field Container	DeFrancesco	OR	2011	Over the top	Slight to moderate injury increasing with rates (1.25, 2.5 and 5 oz per acre) after 1st application; complete recovery 4 weeks after 2nd application; significant growth reduction at 2X and 4X.	20121002a.pdf
28632	Apple & Crabapple (Non-Bearing) (Malus sp.) 'M.domestica'	Field Container	Mathers	OH	2009	Over the top	Slight initial injury with quick recovery, no growth reduction at 0.06, 0.12 and 0.24 lb ai per acre.	20091028f.pdf
28632	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.059, 0.117 and 0.234 lb ai per acre; all treated plants saleable.	20110113c.pdf
28636	Muhly, hairyawn (Muhlenbergia capillaris)	Field Container	Neal	NC	2010	Over the top	Moderate to significant crop injury with 2x an 4x (0.117 and 0.234 lb ai per acre) and inhibition of root growth. No injury with 1x rate.	20110308e.pdf
28636	Muhly, hairyawn (Muhlenbergia capillaris)	Field Container	Stamps	FL	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre; no significant growth reduction.	20100301a.pdf
28636	Muhly, hairyawn (Muhlenbergia capillaris)	Field Container	Uber	CA	2009	Over the top	Slight injury at 0.059, moderate at 0.117, 0.234 lb ai per acre.	20100406a.pdf
31342	Fern, Royal (Osmunda regalis) O.'American Royal'	Field Container	Derr	VA	2011	Over the top	Minor crop injury and significant reduction of fresh shoot weight with .059, .117, .234 lb ai per acre. Good groundsel control.	20120321b.pdf
28643	Peony (Paeonia sp.) P. tenuifolia 'Early Scout'	Field Container	Boydston	WA	2011	Over the top	No crop injury or reduction in growth with two applications at 0.06, 0.12 and 0.23 lb ai per acre.	20111014d.pdf
28740	Mock Orange (Philadelphus sp.) P. viginialis 'Snow Dwarf'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, slight at 0.117, 0.234 lb ai per acre.	20091214a.pdf
28647	Dwarf hydrids (Phormium sp.) P. tenax	Field Container	Mickelbart	IN	2009	Over the top	Unacceptable crop injury with 0.059, 0.117, 0.234 lb ai per acre 3 to 6 WAT leading to mortality.	20101028c.pdf
28649	Andromeda (Pieris sp.) P. japonica 'Mountain Fire'	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.059, 0.117, 0.234 lb ai per acre.	20090924e.pdf
28650	Pine (Pinus sp.) P. eldarica	Field Container	Uber	CA	2010	Over the top	Moderate injury and significant stunting at 0.059, 0.117, 0.234 lb ai per acre.	20101228a.pdf
28650	Pine (Pinus sp.) P. glauca	Field Container	Freiberger	NJ	2009	Over the top	Severe injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28650	Pine (Pinus sp.) P. strobus	Field Container	Trader	MS	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre after 1st, slight after 2nd application; growth reduction at all rates.	20090924e.pdf
28650	Pine (Pinus sp.) P. sylvestris	Field Container	DeFrancesco	OR	2011	Over the top	No injury after 1st application with 1.25, 2.5 and 5 oz per acre; moderate injury with 2X and 4X, with good recovery, after 2nd application; no growth reduction.	20121002a.pdf
28653	Purslane (Portulaca sp.) 'Margarita Rosita'	Field Container	Mathers	OH	2009	Over the top	Unacceptable injury (stem brittleness) at 0.06, 0.12 and 0.24 lb ai per acre	20091028h.pdf
28656	Fir, Douglas (Pseudotsuga menziesii)	Field Container	Boydston	WA	2010	Over the top	No injury after first application, but very slight to moderate injury after second, increasing with rate (0.06, 0.12 and 0.23 lb ai per acre),	20101105q.pdf
28656	Fir, Douglas (Pseudotsuga menziesii)	Field Container	DeFrancesco	OR	2011	Over the top	No injury after 1st application with 1.25, 2.5 and 5 oz per acre, slight injury with 2X and 4X, with complete recovery, after 2nd application; no growth reduction.	20121002a.pdf
28656	Fir, Douglas (Pseudotsuga menziesii)	Field Container	Freiberger	NJ	2009	Over the top	Moderate to severe injury with plant death at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28658	Oak (Quercus sp.) Q. alba	Field Container	Freiberger	NJ	2009	Over the top	Severe injury and plant death at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28658	Oak (Quercus sp.) Q. rubra	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury or growth reduction at 0.06, 0.12 and 0.23 lb ai per acre; all plants marketable.	20100126k.pdf
28658	Oak (Quercus sp.) Q. rubra	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No significant difference in injury or marketability among untreated and 0.059, 0.117, and 0.239 lb ai per acre.	20110525b.pdf
28659	Rose (Rosa sp.) 'Knock Out'	Field Container	Boydston	WA	2010	Over the top	No significant injury with 0.06, 0.12 and 0.23 lb ai per acre after a single application; however, two sequential applications at 0.06, 0.12, and 0.23 lb ai per acre significantly injured and stunted rose plants with half of 1X treated plants saleable, fe	20101105r.pdf
28659	Rose (Rosa sp.) R. 'Knockout'	Field Container	Gilliam	AL	2010	Over the top	No crop injury or difference in growth with 0.059, 0.117, 0.234 lb ai per acre.	20110623b.pdf
28659	Rose (Rosa sp.) R. Meiggl 'Peach Drift'	Field Container	Chandran	WV	2010	Over the top	Significant delay and reduction in bloom and minor to moderate rop injury with two sequential applications at 1.25, 2.5, 5.0 oz/A.	20120308a.pdf
28659	Rose (Rosa sp.) 'Rainbow Knockout'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.059, 0.117, 0.234 lb ai per acre.	20091214a.pdf
28660	Ruscus (Ruscus hypophyllum)	Field Container	Stamps	FL	2009	Over the top	Moderate to severe injury increasing with rates (0.059, 0.117, 0.234 lb ai per acre); significant growth reduction.	20100301a.pdf
28661	Palmetto Palm (Sabal minor)	Field Container	Stamps	FL	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre; no growth reduction.	20100301a.pdf
28663	Beach Naupaka (Scaevola sp.) S. 'Cajun Blue'	Field Container	Derr	VA	2010	Over the top	Significant crop injury and mortality with 0.059, 0.117, 0.234 lb ai per acre. Increasing control of longstalked phyllantus and tasselflower with increasing rates. No control of s. crabgrass at any rate.	20100929a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
28670	Yew (<i>Taxus</i> sp.) T. densiformis	Field Container	DeFrancesco	OR	2011	Over the top	No injury after 1st application with 1.25, 2.5 and 5 oz per acre; slight injury with 1X, moderate with 2X and 4X, after 2nd application; significant growth reduction.	20121002a.pdf
28671	Ternstroemia (<i>Ternstroemia</i> sp.) 'Leann'	Field Container	Gilliam	AL	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre; growth reduction at 4X.	20091119g.pdf
28674	Palm, Windmill (<i>Trachycarpus fortunei</i>)	Field Container	Stamps	FL	2009	Over the top	No injury at 0.059, 0.117, 0.234 lb ai per acre; no significant growth reduction.	20100301a.pdf
28679	Vervain (<i>Verbena</i> sp.) 'Aztec White'	Field Container	Gilliam	AL	2009	Over the top	No significant injury or growth reduction at 0.059, 0.117, 0.234 lb ai per acre.	20091119g.pdf
28679	Vervain (<i>Verbena</i> sp.) V. canadensis 'Homestead Purple'	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.059, 0.117, 0.234 lb ai per acre.	20090924e.pdf
28679	Vervain (<i>Verbena</i> sp.) V. stricta	Field Container	Senesac	NY	2009	Over the top	Slight injury at 0.059, moderate at 0.117 and 0.234 lb ai per acre.	20091130d.pdf
28682	Arrowwood (<i>Viburnum</i> sp.) V. carlcephalum	Field Container	Mathers	OH	2010	Over the top	Ohio: Minor to moderate injury increasing with rate (0.059, 0.117, 0.234 lb ai per acre).	20101005a.pdf
28682	Arrowwood (<i>Viburnum</i> sp.) V. dentatum	Field Container	Freiberger	NJ	2009	Over the top	Severe injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf
28682	Arrowwood (<i>Viburnum</i> sp.) V. dentatum 'Blue muffin'	Field Container	Mathers	MI	2010	Over the top	Spring Meadow: Moderate crop injury at 0.059, 0.117, and 0.234 lb ai per acre.	20101011c.pdf
28682	Arrowwood (<i>Viburnum</i> sp.) V. ovabatum densa 'Dwarf Walter's'	Field Container	Czarnota	GA	2009	Over the top	Moderate injury at 0.059, 0.117, 0.234 lb ai per acre.	20091214a.pdf
28683	Japanese Zelkova (<i>Zelkova serrata</i>)	Field Container	Freiberger	NJ	2009	Over the top	Slight injury at 0.059, 0.117, 0.234 lb ai per acre.	20100129b.pdf

Label Suggestions

For Sulfosulfuron, it is suggested that the label be quite restrictive with over-the-top applications along with fully listing those species exhibiting sensitivity to treatment.

Appendix 1: Contributing Researchers

Dr. Ed Beste	University of Maryland LESREC – Salisbury Facility 27664 Nanticoke Road Salisbury, MD 21801
Dr. Rick Boydston	USDA-ARS IAREC Rt 2 Box 2953-A Prosser, WA 99350
Mr. Luke Case	The Ohio State University Dept. Hort. and Crop Science 2001 Fyffe Ct. Columbus, OH 43210
Dr. Mark Czarnota	University of Georgia Dept. of Horticulture 1109 Experiment St. Griffin, GA 30223
Dr. Joe DeFrancesco	Oregon State University 2040 Cordley Hall Corvallis, OR 97331
Dr. Jeffrey Derr	Hampton Roads Ag. Exp. Station 1444 Diamond Springs Road, Virginia Beach, VA 23455
Dr. Ray Frank	6916 Boyers Mill Road New Market, MD 21774
Mr. Tom Freiberger	Rutgers University Cream Ridge Experiment Station 283 Rt. 539 Cream Ridge, NJ 08514
Dr. Charles Gilliam	Auburn University Department of Horticulture 101 Funchess Hall Auburn, AL 36849
Dr. Nik Grunwald	Horticultural Crops Research Lab USDA-ARS

3420 NW Orchard Ave.
Corvallis, OR 97330

Dr. Jim Klett
Colorado State University
Department of Horticulture and Landscape Architecture
Fort Collins, CO 80523

Dr. Heiner Lieth
Department of Plant Sciences
University of California
One Shield Avenue
Davis, CA 95616

Dr. Hannah Mathers
The Ohio State University
Dept. Hort. and Crop Science
2001 Fyffe Ct.
Columbus, OH 43210

Dr. Mike Mickelbart
Purdue University
Department of Horticulture & Landscape Architecture
625 Agriculture Mall Dr.
West Lafayette, IN 47907-2010

Dr. Joe Neal
North Carolina State University
Department of Horticultural Science
262 Kilgore Hall
Box 7609, NCSU
Raleigh, NC 27695-7609

Dr. Andy Senesac
Long Island Horticultural Research Laboratory
39 Sound Avenue
Riverhead, NY 11901

Dr. Bob Stamps
University of Florida
IFAS/MREC.
2725 Binion Rd.
Apopka, FL 32703

Dr. Brian Trader
Mississippi State University
158 Dorman Hall, Box 9555
Mississippi State, MS 39762

Mr. Buzz Uber
Crop Inspection Service
31130 Hilltop Drive
Valley Center, CA 92082

Dr. Cheryl Wilen
University of California, San Diego
5555 Overland Ave., Bldg. 4

San Diego, CA 92123