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## **IR-4 Ornamental Horticulture Program Sulfentrazone Crop Safety**

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### **Acknowledgements**

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## Abstract

Since 1996 IR-4 has completed 247 trials with products containing sulfentrazone (Sulfentrazone 0.2G and Sulfentrazone 4F) on 111 crops. The data contained in this report was generated to register uses of sulfentrazone on and around ornamental horticulture plants with over-the-top applications. The sulfentrazone rates in the testing programs were 0.125, 0.25 and 0.5 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Sulfentrazone 0.2G had been applied to 54 plant genera or species. Of these, 12 exhibited no or minimal transient injury after application at all three rates. One crop exhibited no phytotoxicity at 0.125 and 0.25 lb ai per acre, but did have some injury at 0.5 lb ai per acre. Only 3 crops (*Canna sp.*, *Echinacea purpurea*, and *Hosta sp.*) exhibited phytotoxicity at even the lowest rate. Sulfentrazone 4F has been applied to 57 crops since 1996. Of these only 6 (*Buxus sp.*, *Ilex vomitoria 'nana'*, *Juniperus horizontalis*, *Rosa sp.*, *Taxus sp.*, and *Thuja sp.*) exhibited no damage with over the top applications at all tested rates. Seven crops had minimal, transitory damage at the lower rates but some phytotoxicity at the 4X rate and 15 crops exhibited damage at all tested rates.

## 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 Sulfentrazone 0.2G and 4F during 2006 and 2007, supplemented with reports from earlier years.

## Materials and Methods

In the 2006 protocol, two applications of Sulfentrazone 0.2G or Sulfentrazone 4F were made approximately 30 days apart. The application rates were 0.125, 0.25 and 0.5 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. For more detailed materials and methods, please see Appendix 1: Protocols.

Sulfentrazone 0.2G and Sulfentrazone 4F were supplied to researchers (See list of researchers in Appendix 2) by FMC Corporation.

## Results and Summary

### *Phytotoxicity*

Based on the type and nature of injury seen with Sulfentrazone 0.2G and 4F 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.

Sulfentrazone 4F exhibited no or minimal negative impact on six plant species: *Abies fraseri*, *Buxus sp.*, *Ilex vomitoria 'nana'*, *Juniperus horizontalis*, *Rosa sp.*, and *Thuja sp.* (Table 1). 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. For 7 crop species, there was no or little injury exhibited at the lower rate(s) tested, but significant phytotoxicity occurred at higher rate(s) (Table 2). It may be prudent to either conduct additional trials or place language on the label indicating applications of Sulfentrazone 4F do not cause injury at lower rates but higher rates may cause unacceptable injury. Fifteen crops in this report exhibited damage sufficient to recommend growers not utilize Sulfentrazone 4F as an over-the-top treatment: *Acer rubrum*, *Chasmanthium latifolium*, *Coreopsis lanceolata*, *Cuphea hyssopifolia*, *Echinacea purpurea*, *Phalaris arundinacea*, *Phlox subulata*, *Prunus avium*, *Rudbeckia hirta*, *Rudbeckia fulgida speciosa*, *Trachelospermum jasminoides*, *Verbena Canadensis*, *Viburnum dentatum*, *V. carlesii*, and *V. tinus compacta* (Table 3). For 29 genera/species, more information is needed either

because only 1 or 2 trials were conducted or because consistent results were not achieved among the research sites (Table 4).

Please see Table 9 for a list of individual trial summaries on Sulfentrazone 4F.

**Table 1. List of Sulfentrazone 4F treated crops with no or minimal transitory injury.**

<i>Abies fraseri</i> <sup>1</sup>	<i>Juniperus horizontalis</i>
<i>Buxus sp.</i>	<i>Rosa sp.</i>
<i>Ilex vomitoria</i> ‘nana’	<i>Thuja sp.</i>

<sup>1</sup>For one in-ground application, moderate injury was observed.

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

<i>Abelia X grandiflora</i>	<i>Pseudotsuga menziesii</i>
<i>Buddleia davidii</i>	<i>Rhododendron sp.</i>
<i>Lagerstroemia indica</i>	<i>Spirea sp.</i>
<i>Lirope muscari</i>	

**Table 3. List of Sulfentrazone 4F treated crops exhibiting significant injury.**

<i>Acer rubrum</i>	<i>Rudbeckia hirta</i>
<i>Chasmanthium latifolium</i>	<i>Rudbeckia fulgida speciosa</i>
<i>Coreopsis lanceolata</i>	<i>Trachelospermum jasminoides</i>
<i>Cuphea hyssopifolia</i>	<i>Verbena canadensis</i>
<i>Echinacea purpurea</i>	<i>Viburnum dentatum</i>
<i>Phalaris arundinacea</i>	<i>Viburnum carlesii</i>
<i>Phlox subulata</i>	<i>Viburnum tinus compacta</i>
<i>Prunus avium</i>	

**Table 4. List of Sulfentrazone 4F treated crops where more information is needed.**

<i>Calamagrostis acutiflora</i>	<i>Hosta sp.</i>
<i>Cotoneaster horizontalis</i>	<i>Hydrangea sp.</i>
<i>Euonymus alatus</i>	<i>Ilex crenata</i>
<i>Euonymus fortunei</i> <sup>2</sup>	<i>Ilex cornuta</i>
<i>Euonymus japonicus</i>	<i>Ilex rotunda</i> <sup>1</sup>
<i>Gaillardia pulchella</i>	<i>Ilex x meserveae</i>
<i>Gardenia augusta</i>	<i>Illicium parviflorum</i> <sup>1</sup>
<i>Gypsophila elegans</i>	<i>Lantana sp.</i> <sup>3</sup>
<i>Hedera helix</i>	<i>Ligustrum sp.</i>

*Magnolia grandiflora*<sup>1</sup>  
*Muhlenbergia capillaris*  
*Panicum virgatum*  
*Pennisetum setaceum*  
*Picea abies*  
*Quercus rubra*

*Ruellia brittoniana*  
*Schizachyrium scoparium*  
*Taxodium distichum*<sup>1</sup>  
*Trachycarpus fortunei*<sup>1</sup>  
*Vinca sp.*

<sup>1</sup> No or minimal transient injury in two trials.

<sup>2</sup> Differential response may be due to different cultivars.

Sulfentrazone 0.2G exhibited no or minimal negative impact on 12 plant species with over the top applications (Table 5). 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. In the research presented here, one plant exhibited significant injury at higher rates consistently among the research sites (Table 6). Only three crops exhibited damage sufficient to recommend growers not utilize Sulfentrazone 0.2G as an over-the-top treatment for pre-emergent weed control: *Canna sp.*, *Echinacea purpurea*, and *Hosta sp.* (Table 7). For 38 genera/species, more information is needed either because only 1 or 2 trials were conducted or because consistent results were not achieved among the research sites (Table 8).

Please see Tables 10 for a list of individual trial summaries on Sulfentrazone 0.2G.

**Table 5. List of Sulfentrazone 0.2G treated crops with no or minimal transitory injury.**

<i>Abies fraseri</i>	<i>Quercus rubra</i>
<i>Acer rubrum</i>	<i>Rhododendron sp.</i>
<i>Buxus microphylla</i>	<i>Rosa sp. (See Lieth 2006)</i>
<i>Chamaebatiaria sp.</i>	<i>Spiraea x bumalda</i>
<i>Delosperma sp.</i>	<i>Thuja occidentalis</i>
<i>Gardenia augusta radicans</i>	
<i>Helleborus niger</i>	

**Table 6. List of Sulfentrazone 0.2G treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity**

*Pseutostuga menziesii (See Frieberger 2006; Lieth 2007)*

**Table 7. List of Sulfentrazone 0.2G treated crops exhibiting significant injury.**

<i>Canna sp.</i>	<i>Echinacea purpurea</i>	<i>Hosta sp.</i>
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**Table 8. List of Sulfentrazone 0.2G treated crops where more information is needed.**

<i>Abelia X grandiflora</i> <sup>1</sup>	<i>Lillium longiflorum</i>
<i>Cotoneaster dammeri</i>	<i>Liriope muscari</i>
<i>Cotoneaster horizontalis</i>	<i>Magnolia grandiflora</i>
<i>Cuphea hyssopifolia</i>	<i>Ophiopogon japonicus</i>
<i>Euonymus alatus</i> <sup>2</sup>	<i>Pentas sp.</i>
<i>Euonymus japonicus</i> <sup>2</sup>	<i>Picea abies</i>
<i>Euonymus patens</i> <sup>2</sup>	<i>Prunus avium</i>
<i>Gypsophila elegans</i>	<i>Prunus serotina</i>
<i>Hedera helix</i>	<i>Rudbeckia fulgida</i>
<i>Illicium parviflorum</i>	<i>Salvia sp.</i>
<i>Ilex cornuta</i> <sup>2</sup>	<i>Spiraea decumbent s</i> <sup>2</sup>
<i>Ilex crenata</i> <sup>2</sup>	<i>Spiraea japonica</i> <sup>2</sup>
<i>Ilex rotunda</i> <sup>2</sup>	<i>Taxodium distichum</i>
<i>Ilex x meserveae</i> <sup>2</sup>	<i>Trachelospermum asiaticum</i>
<i>Ilex vomitoria 'nana'</i> <sup>2</sup>	<i>Trachycarpus fortunei</i>
<i>Juniperus conferta</i>	<i>Viburnum carlesii</i> <sup>2</sup>
<i>Juniperus horizontalis</i> <sup>2</sup>	<i>Viburnum dentatum</i> <sup>1</sup>
<i>Lagerstroemia indica</i> <sup>2</sup>	<i>Viburnum tinus</i> <sup>2</sup>
<i>Lantana sp.</i>	<i>Vinca minor</i>

<sup>1</sup> No or minimal transient injury in two trials.

<sup>2</sup> This species did not exhibit injury across 2 or more species in the same genera with Sulfentrazone 0.2G formulation and/or did not demonstrate injury with Sulfentrazone 4F formulation.



**Table 9. Detailed Summary of Crop Safety Testing with Sulfentrazone 4F.**

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 4/29/09 are listed below.

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
26620	Abelia	Abelia sp.	A. x grandiflora 'John Creech'	Field Container	Neal	2006	Over the top	Slight transient injury at 0.125 lb ai per acre and moderate, unacceptable injury at 0.25 and 0.5 lb ai per acre.	20070225f.pdf
25916	Fir, Fraser	Abies fraseri		Field Container	Altland	2006	Over the top	No significant injury at 0.125, 0.25, and 0.5 lb ai per acre.	20070110p.pdf
25916	Fir, Fraser	Abies fraseri		Field Container	Lieth	2007	Over the top	No injury significantly different from untreated at 0.125, 0.25, and 0.5 lb ai per acre, however, sun damage did occur on all treatments after 4 WAT masking potential injury.	20080227m.pdf
25916	Fir, Fraser	Abies fraseri		Field Container	Freiberger	2006	Over the top	Virtually no injury at all rates (0.125, 0.25 and 0.5 lb ai per acre) after 1st, moderate after 2nd application; no growth reduction	20070405.pdf
25916	Fir, Fraser	Abies fraseri		Field Container	Freiberger	2007	Over the top	No injury at 0.125 and 0.25, slight injury at 0.5 lb ai per acre	200802271.pdf
25937	Fir, Fraser	Abies fraseri		Field In-Ground	Ahrens/Mervosh	2006	Over the top	No injury to dormant trees, slight to moderate injury to actively growing trees at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070418e.pdf
25934	Maple, Red	Acer rubrum		Field Container	Freiberger	2006	Over the top	High injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070405.pdf
25934	Maple, Red	Acer rubrum	'Red Sunset'	Field Container	Williams	2007	Over the top	Virtually no injury at 0.125, slight at 0.25 and 0.5 lb ai per acre	20081014a.pdf
25003	Butterfly Bush	Buddleia davidii	'Black Knight'	Field Container	Derr	2005		Low injury at 0.25 and 0.5 lb ai per acre, unacceptable at 1.0 lb ai per acre.	20060217p.pdf
25884	Boxwood	Buxus sp.		Field Container	Derr	2005	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.	20060217p.pdf
25884	Boxwood	Buxus sp.	B. 'Green Velvet'	Field Container	Williams	2007	Over the top	No significant injury at 0.125, 0.25, and 0.5 lb ai per acre.	20081014a.pdf
25884	Boxwood	Buxus sp.	B. microphylla 'Green Beauty'	Field Container	Wilén	2006	Over the top	Acceptable injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061201i.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25884	Boxwood	Buxus sp.	'Green Mountain'	Field Container	Marshall	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20070110b.pdf
25096	Feather Reed Grass	Calamagrostis acutiflora	Karl Foerester	Field Container	Neal	2005	Broadcast	Slight and temporary injury at 0.125 and 0.25 lb ai per acre; moderate but temporary at 0.5 lb ai per acre.	20060217j.pdf
25106	Northern Sea Oats, Wild Oats	Chasmanthium latifolium		Field Container	Neal	2005	Broadcast	Severe injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20060217j.pdf
24526	Lance Coreopsis	Coreopsis lanceolata		Field In-Ground	Norcini	2005		Moderate to severe injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20060217s.pdf
25955	Cotoneaster	Cotoneaster sp.		Field Container	Williams	2007	Over the top	No injury at 0.125, slight at 0.25 and 0.5 lb ai per acre	20081014a.pdf
25955	Cotoneaster	Cotoneaster sp.	C. horizontalis	Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
25793	Mexican Heather, False Heather, Elfin Herb	Cuphea hyssopifolia		Field In-Ground	Chen	2005	Foliar	Moderate to severe injury (0.25, 0.5, 1.0 lb ai per acre).	20060202r.pdf
25965	Purple Coneflower	Echinacea sp.	'Ruby Star'	Field Container	Derr	2007	Over the top	Significant injury at 0.125, 0.25 and 0.5 lb ai per acre with 4F and at the highest rate with G formulations; poor yellow nutsedge control	20071219d.pdf
25983	Euonymus	Euonymus sp.	E. alatus 'Compacta'	Field Container	Williams	2007	Over the top	Moderate injury at 0.125, 0.25 and 0.5 lb ai per acre	20081014a.pdf
25983	Euonymus	Euonymus sp.	E. alatus 'Compactus'	Field Container	Ahrens/Mervosh	2006	Over the top	Slight injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070418c.pdf
25983	Euonymus	Euonymus sp.	E. fortunei	Field Container	Derr	2005	Over the top	No injury at all rates (0.25, 0.5, 1.0 lb ai per acre).	20060217p.pdf
25983	Euonymus	Euonymus sp.	E. fortunei 'Coloratus'	Field Container	Williams	2007	Over the top	Virtually no injury at 0.125, 0.25 and 0.5 lb ai per acre	20081014a.pdf
25983	Euonymus	Euonymus sp.	E. japonicus 'Aureo Marginatus'	Field Container	Wilen	2006	Over the top	Acceptable injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061201i.pdf
24528	Blanket Flower	Gaillardia sp.	G. pulchella	Field In-Ground	Norcini	2005		Moderate, transient injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20060217s.pdf
26549	Cape Jasmine, Radicans	Gardenia augusta 'Radicans'		Field Container	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25953	Baby's-Breath	Gypsophila elegans		Field Container	Senesac	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061108f.pdf
26690	English Ivy	Hedera helix L. ssp. Helix		Field Container	Derr	2005		Very slight injury at all rates (0.25, 0.5, 1.0 lb ai per acre).	20060217p.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
26690	English Ivy	Hedera helix L. ssp. Helix	'Thorndale'	Field Container	Williams	2007	Over the top	Virtually no injury at 0.125, 0.25 and 0.5 lb ai per acre	20081014a.pdf
26691	Hosta	Hosta sp.	'Halcyon'	Field Container	Derr	2005		Very low phyto at 0.25 and 0.5 lb ai per acre; low phyto at 1.0 lb ai per acre.	20060217p.pdf
24529	Hydrangea	Hydrangea sp.	H. paniculata 'Pink Diamond'	Field Container	Norcini	2005		Moderate to severe increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20060217q.pdf
24529	Hydrangea	Hydrangea sp.	Variegated	Field Container	Derr	2005		Very slight injury at all rates (0.25, 0.5, 1.0 lb ai per acre).	20060217p.pdf
25958	Holly	Ilex sp.		Field Container	Trader	2007	Over the top	No injury or growth reduction at 0.125, 0.25 and 0.5 lb ai per acre	20080116i.pdf
25958	Holly	Ilex sp.	I. cornuta 'bufordii nana'	Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
25958	Holly	Ilex sp.	I. crenata 'Green Luster'	Field Container	Whitwell	2007	Over the top	No injury at 0.125, 0.25 and 0.5 lb ai per acre after 1st, significant injury with quick recovery after 2nd application; no growth reduction	20071106h.pdf
26583	Holly	Ilex sp.	I. rotunda	Field In-Ground	Czarnota	2005	Over the top	Slight injury increasing with rate (0.094, 0.188, 0.375, 0.75 lb ai per acre).	20070225c.pdf
26583	Holly	Ilex sp.	I. rotunda	Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25958	Holly	Ilex sp.	I. x meserveae 'Blue Princess'	Field Container	Altland	2006	Over the top	Slight to moderate, transient injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf
25958	Holly	Ilex sp.	'Ivory queen'	Field Container	Marshall	2006		Slight to moderate injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20070110b.pdf
25929	Holly, Dwarf Yaupon	Ilex vomitoria 'nana'		Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
25929	Holly, Dwarf Yaupon	Ilex vomitoria 'nana'		Field Container	Lieth	2007	Over the top	No injury or growth reduction at 0.125, 0.25 and 0.5 lb ai per acre	20080128c.pdf
25929	Holly, Dwarf Yaupon	Ilex vomitoria 'nana'		Field Container	Trader	2007	Over the top	No injury at 0.125, 0.25 and 0.5 lb ai per acre; very slight growth reduction at 4X	20080116i.pdf
25929	Holly, Dwarf Yaupon	Ilex vomitoria 'nana'	'Schillings'	Field Container	Whitwell	2007	Over the top	No injury or growth reduction at 0.125, 0.25 and 0.5 lb ai per acre	20071106h.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
26577	Anise Tree	Illicium sp.	I. parviflorum	Field In-Ground	Czarnota	2005	Over the top	Very slight injury at all rates (0.094, 0.188, 0.375, 0.75 lb ai per acre).	20070225c.pdf
26577	Anise Tree	Illicium sp.	I. parviflorum	Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
12113	Juniper	Juniperus sp.	J. horizonatis 'Bar Harbor'	Field In-Ground	Derr	2005		No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20060217p.pdf
12113	Juniper	Juniperus sp.	J. horizontalis 'Plumosa'	Field In-Ground	Ahrens	1996		No injury (0.125, 0.25, 0.5 lb ai per acre). NOTE: this trial used Spartan 75DF.	20080818a.pdf
12113	Juniper	Juniperus sp.	J. horizontalis 'Wiltoni'	Field In-Ground	Norcini	2005		No injury (0.25, 0.5, 1.0 lb ai per acre).	20060217q.pdf
24530	Crape Myrtle	Lagerstroemia indica		Field In-Ground	Czarnota	2005	Over the top	No injury at 0.094, 0.188, 0.375, and 0.75 lb ai per acre.	20070225c.pdf
24530	Crape Myrtle	Lagerstroemia indica		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
24518	Crape Myrtle	Lagerstroemia indica	'Cheyenne'	Field Container	Norcini	2005		Moderate injury, plants recovered by 12 WAT (0.125, 0.25, 0.5 lb ai per acre).	20060217q.pdf
24518	Crape Myrtle	Lagerstroemia indica	L. x Tuscarora	Field Container	Neal	2006	Over the top	Moderate to significant injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20070225f.pdf
24737	Shrub Verbena	Lantana sp.		Field In-Ground	Williams	2007	Over the top	No injury at 0.125, very slight at 0.25 and 0.5 lb ai per acre	20081014a.pdf
24737	Shrub Verbena	Lantana sp.	'New Gold'	Field In-Ground	Chen	2005	Foliar	Moderate to severe injury (0.25, 0.5, 1.0 lb ai per acre).	20060202r.pdf
25014	Privet	Ligustrum sp.	'Chinense'	Field Container	Derr	2005		Low phyto at 0.25 and 0.5 lb ai per acre; unacceptable at 1.0 lb ai per acre.	20060217p.pdf
25299	Lilyturf, Big Blue;Giant	Liriope muscari	'Big Blue'	Field In-Ground	Chen	2005	Foliar	Moderate to severe (0.25, 0.5, 1.0 lb ai per acre).	20060202r.pdf
25962	Lilyturf, Creeping	Liriope sp.	L. muscari variegata	Field Container	Derr	2005		Low at 0.25 and 0.5 lb ai per acre; unacceptable at 1 lb per acre.	20060217p.pdf
25962	Lilyturf, Creeping	Liriope sp.	L. muscari variegata	Field Container	Neal	2006	Over the top	Slight transient injury at 0.125 and 0.25 lb ai per acre and moderate unacceptable injury at 0.5 lb ai per acre.	20070225f.pdf
25962	Lilyturf, Creeping	Liriope sp.	L. muscari variegata 'Aztec'	Field Container	Derr	2007	Over the top	Slight injury at 0.125, 0.25 and 0.5 lb ai per acre.	20071219d.pdf
26558	Magnolia, Southern	Magnolia grandiflora		Field In-Ground	Czarnota	2005	Over the top	No injury at 0.094, 0.188, 0.375, and 0.75 lb ai per acre.	20070225c.pdf
26558	Magnolia, Southern	Magnolia grandiflora		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25288	Muhly, hairyawn	Muhlenbergia capillaris		Field Container	Neal	2005	Broadcast	No injury at 0.125 lb ai per acre, slight and transient at 0.25 lb ai per acre, moderate at 0.5 lb ai per acre.	20060217j.pdf
25792	None	None		Field In-Ground	Chen	2005	Foliar		20030202r.pdf
25792	None	None		Field In-Ground	Senesac	2007	Post + 4 weeks	Good to excellent control at 0.125 lb ai per acre	20080128a.pdf
25098	Switch-Grass	Panicum virgatum	'Shenandoah'	Field Container	Neal	2005	Broadcast	Moderate but temporary injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20060217j.pdf
25100	Fountain Grass	Pennisetum setaceum	'Cassian'	Field Container	Neal	2005	Broadcast	Slight but temporary injury at 0.125 lb ai per acre, moderate but temporary at 0.25 and 0.5 lb ai per acre.	20060217j.pdf
25287	Ribbon-Grass, Gardeners-Garters	Phalaris arundinacea	'Strawberries and Cream'	Field Container	Neal	2005	Broadcast	Moderate to severe injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20060217j.pdf
24767	Phlox	Phlox sp.	P. subulata 'Emerald Blue'	Field Container	Derr	2005		Plants outgrew visible damage but there appeared to be reduction in fresh shoot weight (0.25, 0.5, 1.0 lb ai per acre)	20060217p.pdf
25301	Creeping Phlox, Moss Pink	Phlox subulata	'Candy Strip'	Field In-Ground	Chen	2005	Foliar	Slight to moderate injury (0.25, 0.5, 1.0 lb ai per acre).	20060202r.pdf
25932	Spruce, Norway	Picea abies		Field Container	Altland	2006	Over the top	No injury after the first application and only very slight injury at the highest rate after the second (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf
25932	Spruce, Norway	Picea abies		Field Container	Freiberger	2006	Over the top	No injury at all rates (0.125, 0.25 and 0.5 lb ai per acre) after 1st, moderate after 2nd application; no growth reduction	20070405.pdf
25931	Cherry (Non-Bearing)	Prunus sp.	P. avium	Field Container	Altland	2006	Over the top	Moderate injury increasing with rate along with decrease in plant height and caliper (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf
25915	Fir, Douglas	Pseudotsuga menziesii		Field Container	Altland	2006	Over the top	Minor injury after the first application at all rates, but no injury after the second (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25915	Fir, Douglas	<i>Pseudotsuga menziesii</i>		Field Container	Lieth	2007	Over the top	No significant injury at 0.125 lb ai per acre after a single application; however chlorotic shoot tips and nectoric needles were observed after the second application.	20080227m.pdf
25941	Fir, Douglas	<i>Pseudotsuga menziesii</i>		Field In-Ground	Ahrens/Mervosh	2006	Over the top	No injury to dormant trees, acceptable injury to actively growing trees at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070418d.pdf
25915	Fir, Douglas	<i>Pseudotsuga menziesii</i>	<i>P. menziesii glauca</i>	Field Container	Freiberger	2006	Over the top	Slight injury at 0.125 and 0.25 lb ai per acre, moderate at 4X rate; no growth reduction	20070405.pdf
25915	Fir, Douglas	<i>Pseudotsuga menziesii</i>	<i>P. menziesii glauca</i>	Field Container	Freiberger	2007	Over the top	Slight to moderate injury at 0.125 and 0.25, moderate to high at 0.5 lb ai per acre	20080227i.pdf
25930	Oak, Northern Red	<i>Quercus rubra</i>		Field Container	Altland	2006	Over the top	Slight transient injury after the first application, but no significant injury after the second (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf
25930	Oak, Northern Red	<i>Quercus rubra</i>		Field Container	Freiberger	2006	Over the top	Moderate injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070405.pdf
25952	Azalea, & Rhododendron	<i>Rhododendron</i> sp.	'Amelia Rose'	Field Container	Gilliam	2007	Over the top	Slight injury after 1st but none after 2nd application only at 0.5 lb ai per acre (4X); no growth reduction	20071219j.pdf
25952	Azalea, & Rhododendron	<i>Rhododendron</i> sp.	'Ex Cannons Double PK'	Field Container	Marshall	2006	Over the top	No to slight injury increasing with rate, but no difference in plant growth (0.125, 0.25, 0.5 lb ai per acre).	20070110b.pdf
25952	Azalea, & Rhododendron	<i>Rhododendron</i> sp.	'Fashion'	Field Container	Norcini	2005		Slight transient injury (0.25, 0.5, 1.0 lb ai per acre).	20060217q.pdf
25952	Azalea, & Rhododendron	<i>Rhododendron</i> sp.	'Formosa'	Field Container	Derr	2005		Moderate but transient injury at all rates (0.25, 0.5, 1.0 lb ai per acre).	20060217p.pdf
25952	Azalea, & Rhododendron	<i>Rhododendron</i> sp.	'George Tabor'	Field Container	Derr	2007	Over the top	Very slight injury at 0.125, 0.25 and 0.5 lb ai per acre with G and 4F formulations; poor yellow nutsedge control	20071219d.pdf
25952	Azalea, & Rhododendron	<i>Rhododendron</i> sp.	'Nuccio's Wild Cherry'	Field Container	Wilén	2006	Over the top	Unacceptable injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061201i.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25952	Azalea, & Rhododendron	Rhododendron sp.	'Pink Gumpo'	Field Container	Neal	2006	Over the top	Slight transient injury at 0.125 lb ai per acre and moderate unacceptable injury at 0.25 and 0.5 lb ai per acre.	20070307e.pdf
25952	Azalea, & Rhododendron	Rhododendron sp.	Rhododendron 'P.J.M.'	Field Container	Ahrens/Mervosh	2006	Over the top	Slight injury after 1st, no injury after 2nd application at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070418f.pdf
25952	Azalea, & Rhododendron	Rhododendron sp.	'Tradition'	Field Container	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25966	Rose	Rosa sp.		Field Container	Trader	2007	Over the top	No injury but slight growth reduction at 0.125, 0.25 and 0.5 lb ai per acre	20080116i.pdf
25966	Rose	Rosa sp.	R. multiflora	Field Container	Freiberger	2006	Over the top	No to slight injury at all rates (0.125, 0.25 and 0.5 lb ai per acre) after 1st, moderate after 2nd application; no growth reduction	20070405.pdf
25966	Rose	Rosa sp.	'Sea Foam'	Field Container	Senesac	2006	Over the top	Slight, transient injury after second application (0.125, 0.25, 0.5 lb ai per acre).	20061108f.pdf
24527	Black-Eyed Susan	Rudbeckia bicolor	R. hirta	Field In-Ground	Norcini	2005	Over the top	Moderate to severe initial injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20060217s.pdf
26062	Coneflower, Orange	Rudbeckia fulgida speciosa		Field Container	Williams	2007	Over the top	Slight injury at 0.125, moderate at 0.25 and 0.5 lb ai per acre	20081014a.pdf
26062	Coneflower, Orange	Rudbeckia fulgida speciosa	'Meadowbrite'	Field Container	Marshall	2006	Over the top	Moderate to significant injury as well as significant decrease in growth, increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20070110b.pdf
24789	Mexican Petunia	Ruellia carolinensis	R. brittoniana 'Katie'	Field In-Ground	Chen	2005	Foliar	Slight injury (0.25, 0.5, 1.0 lb ai per acre).	20060202r.pdf
25684	Little Blue Stem	Schizachyrium scoparium		Field Container	Neal	2005	Broadcast	Slight and moderate but temporary injury at 0.125 and 0.25 lb ai per acre, but significant at 0.5 lb ai per acre.	20060217j.pdf
25954	Bridal-Wreath	Spiraea sp.	'Goldflame'	Field Container	Ahrens/Mervosh	2006	Over the top	Moderate to high injury after the 1st application at all rates (0.125, 0.25 and 0.5 lb ai per acre), less injury after 2nd application	20070418a.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25954	Bridal-Wreath	Spiraea sp.	S. decumbens	Field Container	Senesac	2006	Over the top	Significant injury especially at higher rates (0.125, 0.25, 0.5 lb ai per acre).	20061108f.pdf
25954	Bridal-Wreath	Spiraea sp.	S. japonica 'Little Princess'	Field Container	Neal	2006	Over the top	Slight transient injury at 0.125 and 0.25 lb ai per acre and moderate unacceptable injury at 0.5 lb ai per acre.	20070225f.pdf
26554	Bald Cypress	Taxodium distichum		Field In-Ground	Czarnota	2005	Over the top	No injury at 0.094, 0.188, 0.375, and 0.75 lb ai per acre.	20070225c.pdf
26554	Bald Cypress	Taxodium distichum		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25914	Arborvitae	Thuja sp.	'Emerald Green'	Field Container	Ahrens/Mervosh	2006	Over the top	No injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070418b.pdf
12112	Arborvitae	Thuja sp.	T. occidentalis	Field In-Ground	Czarnota	2005		No injury at 0.088, 0.194, 0.375, and 0.75 lb ai per acre.	20070225c.pdf
12112	Arborvitae	Thuja sp.	T. occidentalis	Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25914	Arborvitae	Thuja sp.	T. occidentalis 'Techney'	Field Container	Williams	2007	Over the top	No injury at 0.125, very slight at 0.25 and 0.5 lb ai per acre	20081014a.pdf
25914	Arborvitae	Thuja sp.	T. occidentalis 'Elegantissima'	Field Container	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
26463	Jasmine, Star;Confederate	Trachelospermum jasminoides		Field Container	Wilen	2006	Over the top	Slight to moderate unacceptable injury increasing with rate after single application, but second application yielded unacceptable injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061201i.pdf
26571	Palm, Windmill	Trachycarpus fortunei		Field In-Ground	Czarnota	2005	Over the top	Very slight to slight injury at all rates (0.094, 0.188, 0.375, 0.75 lb ai per acre).	20070225c.pdf
26571	Palm, Windmill	Trachycarpus fortunei		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
24753	Vervain	Verbena sp.	V. canadensis 'Homestead Purple'	Field In-Ground	Chen	2005	Foliar	Moderate to severe injury (0.25, 0.5, 1.0 lb ai per acre)	20060202r.pdf
25016	Viburnum, arrowwood	Viburnum dentatum		Field Container	Freiberger	2006	Over the top	Slight to moderate injury at 0.125 and 0.25 lb ai per acre, high at 4X rate; some growth reduction	20070405.pdf
25016	Viburnum, arrowwood	Viburnum dentatum	'Autum Jazz'	Field Container	Altland	2006	Over the top	Moderate to significant injury with single application at all rates (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf



PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25016	Viburnum, arrowwood	Viburnum dentatum	'Mirrorleaf'	Field Container	Derr	2005		Slight, transient injury at all rates (0.25, 0.5, 1.0 lb ai per acre)	20060217p.pdf
26525	Arrowwood	Viburnum sp.	V. carlessi	Field Container	Altland	2006	Over the top	Moderate to significant injury with single application at all rates (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf
26525	Arrowwood	Viburnum sp.	V. tinus compacta	Field Container	Neal	2006	Over the top	Slight transient injury at 0.125 lb ai per acre and moderate, unacceptable injury at 0.25 and 0.5 lb ai per acre.	20070225f.pdf
25964	Periwinkle	Vinca sp.	'Alba'	Field Container	Marshall	2006	Over the top	No visible injury however plant growth was reduced increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20070110b.pdf
25964	Periwinkle	Vinca sp.	V. minor	Field Container	Freiberger	2007	Over the top	No injury after 1st, slight injury after 2nd application at 0.125, 0.25 and 0.5 lb ai per acre	20080227l.pdf
Sulfentrazone 75DF was used in the trials conducted below:									
12114	Azalea, & Rhododendron	Rhododendron sp.	R. catawbiense 'Roseum Elegans'	Field In-Ground	Ahrens	1996	2nd app over actively growing material	No injury (0.125, 0.25, 0.5 lb ai per acre).	20080818i.pdf
12114	Azalea, & Rhododendron	Rhododendron sp.	R. catawbiense 'Roseum Elegans'	Field In-Ground	Ahrens/Mervosh	1995	1st app over actively growing material	No injury (0.125, 0.25, 0.5 lb ai per acre). NOTE: this trial used Spartan 75DF.	20080818i.pdf
12110	Yew	Taxus sp.	T. cuspidata 'capitata'	Field In-Ground	Ahrens	1996	1st app over dormant	No injury at 0.125, 0.25, and 0.275 lb ai per acre.	20080818c.pdf
12110	Yew	Taxus sp.	T. cuspidata 'capitata'	Field In-Ground	Ahrens/Mervosh	1997	2nd app over dormant	No injury at 0.125, 0.25, and 0.275 lb ai per acre.	20080818d.pdf
12112	Arborvitae	Thuja sp.	T. occidentalis 'Globosa'	Field In-Ground	Ahrens	1996	1st app over dormant	No injury at 0.125, 0.25 and 0.375 lb ai per acre; NOTE: this trial used Spartan 75DF.	20080818f.pdf
12112	Arborvitae	Thuja sp.	T. occidentalis 'Globosa'	Field In-Ground	Ahrens	1996		No injury at 0.125, 0.25 and 0.375 lb ai per acre; NOTE: this trial used Spartan 75DF.	20080818e.pdf
12112	Arborvitae	Thuja sp.	T. occidentalis 'Globosa'	Field In-Ground	Ahrens/Mervosh	1997	2nd app over dormant	No injury at 0.125, 0.25 and 0.375 lb ai per acre; NOTE: this trial used Spartan 75DF.	20080818g.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
12111	Hemlock	Tsuga sp.	T. canadensis	Field In-Ground	Ahrens	1996	2nd app over actively growing material	Minor injury to hemlock tips. NOTE: this trial used Spartan 75DF.	20080818h.pdf
12111	Hemlock	Tsuga sp.	T. canadensis	Field In-Ground	Ahrens/Mervosh	1995	1st app over actively growing material	Minor injury to hemlock tips. NOTE: this trial used Spartan 75DF.	20080818h.pdf

**Table 10. Detailed Summary of Crop Safety Testing with Sulfentrazone 0.2G**

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 4/29/09 are listed below.

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25372	Abelia	Abelia sp.	A. x grandiflora 'John Creech'	Field Container	Neal	2006	Over the top	No injury at 0.125 and 0.25 lb ai per acre with slight, transient injury at 0.5 lb ai per acre.	20070225f.pdf
25372	Abelia	Abelia sp.	A. x grandiflora 'Little Richard'	Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf
25366	Fir, Fraser	Abies fraseri		Field Container	Altland	2006	Over the top	No significant injury at 0.125, 0.25, and 0.5 lb ai per acre.	20070110p.pdf
25366	Fir, Fraser	Abies fraseri		Field Container	Lieth	2007	Over the top	No injury significantly different from untreated at 0.125, 0.25, and 0.5 lb ai per acre, however, sun damage did occur on all treatments after 4 WAT masking potential injury.	20080227m.pdf
25366	Fir, Fraser	Abies fraseri		Field Container	Freiberger	2007	Over the top	No injury at 0.125, 0.25 and 0.5 lb ai per acre	20080227l.pdf
25359	Maple, Red	Acer rubrum		Field Container	Mathers	2006	Over the top	No significant injury at 0.125, 0.25, and 0.5 lb ai per acre.	20070110l.pdf
25923	Maple, Red	Acer rubrum		Field In-Ground	Beste/Frank	2006		Slight to moderate, but transient, injury increasing with rate (0.125, 0.25, and 0.5 lb ai per acre); all plants marketable at end of experiment.	20070412e.pdf
25359	Maple, Red	Acer rubrum		Field Container	Fraelich	2006	Over the top	No injury or growth reduction at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061211f.pdf
25322	Boxwood	Buxus sp.	B. microphylla 'Green Beauty'	Field Container	Wilen	2006	Over the top	Acceptable injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061201i.pdf
25322	Boxwood	Buxus sp.	B. microphylla 'Green Velvet'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111n.pdf
25322	Boxwood	Buxus sp.	B. microphylla var koreana	Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25322	Boxwood	Buxus sp.	'Green Mountain'	Field Container	Mathers	2006	Over the top	No injury at 0.125 lb ai per acre, moderate injury at 0.25 lb ai per acre, and slight injury at 0.5 lb ai per acre.	20070110l.pdf
25374	Canna	Canna sp.	'Cherry'	Field Container	Fraelich	2006	Over the top	Moderate injury at 1X and 2X rates, severe at 4X; growth reduction at all rates	20061211g.pdf
25365	Fernbush	Chamaebatiaria sp.		Field Container	Klett	2006	Over the top	Experiment A: No significant injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25365	Fernbush	Chamaebatiaria sp.		Field Container	Klett	2006	Over the top	Experiment B: No significant injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25365	Fernbush	Chamaebatiaria sp.		Field Container	Klett	2006	Over the top	Experiment C: No significant injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25375	Cotoneaster	Cotoneaster sp.	C. dammeri 'Skolgshomen'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111s.pdf
25375	Cotoneaster	Cotoneaster sp.	C. horizontalis	Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
25293	Mexican Heather, False Heather, Elfin Herb	Cuphea hyssopifolia	C. allyson	Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061110l.pdf
25293	Mexican Heather, False Heather, Elfin Herb	Cuphea hyssopifolia	C. hyssopifolia 'Itsy Bitsy White'	Field Container	Lieth	2006	Over the top	High injury and growth reduction at all rates; plants unmarketable (0.125, 0.25, 0.5 lb ai per acre).	20061201d.pdf
25363	Delosperma sp.	Delosperma sp.	'Kelaidis'	Field Container	Klett	2006	Over the top	Experiment A: No significant injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25363	Delosperma sp.	Delosperma sp.	'Kelaidis'	Field Container	Klett	2006	Over the top	Experiment B: No significant injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25363	Delosperma sp.	Delosperma sp.	'Kelaidis'	Field Container	Klett	2006	Over the top	Experiment C: No significant injury at 0.125 and 0.25 lb ai per acre, slight at 0.5 lb ai	20070108a.pdf
25377	Purple Coneflower	Echinacea sp.		Field Container	Klett	2006	Over the top	Experiment A: Severe injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25377	Purple Coneflower	Echinacea sp.		Field Container	Klett	2006	Over the top	Experiment B: Severe injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25377	Purple Coneflower	Echinacea sp.		Field Container	Klett	2006	Over the top	Experiment C: Severe injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25377	Purple Coneflower	Echinacea sp.	E. purpurea magnus	Field Container	Fraelich	2006	Over the top	Severe injury and stunting at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061211h.pdf
25377	Purple Coneflower	Echinacea sp.	E. purpurea 'Magnus'	Field Container	Boydston	2006	Over the top	Significant injury and growth reduction at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061109d.pdf
25377	Purple Coneflower	Echinacea sp.	'Ruby Star'	Field Container	Derr	2007	Over the top	Significant injury at 0.5 lb ai per acre.	20071219d.pdf
25007	Euonymus	Euonymus sp.	E. alata 'Compacta'	Field Container	Mathers	2006	Over the top	Very slight injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20070110l.pdf
25007	Euonymus	Euonymus sp.	E. alatus 'Compactus'	Field Container	Ahrens/Mervosh	2006	Over the top	Virtually no injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070418c.pdf
25007	Euonymus	Euonymus sp.	E. japonicus 'Aureo Marginatus'	Field Container	Wilén	2006	Over the top	Acceptable injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061201i.pdf
25007	Euonymus	Euonymus sp.	E. patens 'Manhattan'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111q.pdf
25378	Cape Jasmine, Radicans	Gardenia augusta 'Radicans'		Field Container	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25378	Cape Jasmine, Radicans	Gardenia augusta 'Radicans'		Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061110l.pdf
25378	Cape Jasmine, Radicans	Gardenia augusta 'Radicans'	'Radicans'	Field Container	Fraelich	2006	Over the top	No injury or growth reduction at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061211i.pdf
25358	Baby's-Breath	Gypsophila elegans		Field Container	Senesac	2006	Over the top	No injury at lower rates; very slight, transient injury at highest (0.125, 0.25, 0.5 lb ai per acre).	20061108g.pdf
26036	Baby's Breath	Gypsophila paniculata	'Festival Star'	Field Container	Lieth	2006	Over the top	Unacceptable injury and growth reduction at 0.125, 0.25 and 0.50 lb ai per acre	20070717c.pdf
25005	English Ivy	Hedera helix L. ssp. Helix		Field Container	Boydston	2006	Over the top	No injury but delayed growth; plants marketable (0.125, 0.25, 0.5 lb ai per acre).	20061109a.pdf
25005	English Ivy	Hedera helix L. ssp. Helix	'Glacier Ivy'	Field Container	Fraelich	2006	Over the top	Slight injury at 1X and 2X rates, moderate at 4X; no growth reduction	20061211c.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25367	Hellebore, Christmas rose, Lenten Rose	Helleborus niger		Field Container	Klett	2006	Over the top	Experiment A: No significant injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25367	Hellebore, Christmas rose, Lenten Rose	Helleborus niger		Field Container	Klett	2006	Over the top	Experiment B: No significant injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070108a.pdf
25367	Hellebore, Christmas rose, Lenten Rose	Helleborus niger		Field Container	Klett	2006	Over the top	Experiment C: No significant injury after 1st application at all rates (0.125, 0.25 and 0.5 lb ai per acre), slight after 2nd application at 2X and 4X	20070108a.pdf
25367	Hellebore, Christmas rose, Lenten Rose	Helleborus niger	'Pink Lady'	Field Container	Boydston	2006	Over the top	Virtually no injury at 0.125, 0.25 and 0.5 lb ai per acre; most plants did not survive severe winter	20071017h.pdf
25009	Hosta	Hosta sp.	'Gold Standard'	Field Container	Fraelich	2006	Over the top	Severe injury at all rates; severe growth reduction at 2X and 4X rates	20061211d.pdf
25009	Hosta	Hosta sp.	H. plantaginea 'Royal Standard'	Field Container	Gilliam	2006	Over the top	Slight to moderate injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre), and there was a reduction in plant size.	20070212a.pdf
24531	Holly	Ilex sp.	I. cornuta 'bufordii nana'	Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
24531	Holly	Ilex sp.	I. cornuta 'Carissa'	Field Container	Fraelich	2006	Over the top	No injury or growth reduction at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061211a.pdf
24531	Holly	Ilex sp.	I. crenata 'Compacta'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111p.pdf
24531	Holly	Ilex sp.	I. crenata 'Green Lustre'	Field Container	Norcini	2005		Very slight injury at all rates, but no impact on marketability (0.125, 0.25, 0.5 lb ai per acre).	20060217q.pdf
26582	Holly	Ilex sp.	I. rotunda	Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
24531	Holly	Ilex sp.	I. x meserveae 'Blue Prince'	Field Container	Mathers	2006	Over the top	No injury at any rate (0.125, 0.25, 0.5 lb ai per acre).	20070110l.pdf
24531	Holly	Ilex sp.	I. x meserveae 'Blue Princess'	Field Container	Altland	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070110p.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25427	Holly, Dwarf Yaupon	<i>Ilex vomitoria</i> 'nana'		Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, 0.5 lb ai per acre.	20070212a.pdf
25427	Holly, Dwarf Yaupon	<i>Ilex vomitoria</i> 'nana'		Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
26576	Anise Tree	<i>Illicium</i> sp.	<i>I. parviflorum</i>	Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
24532	Juniper	<i>Juniperus</i> sp.	<i>J. conferta</i> 'Blue Pacific'	Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf
24532	Juniper	<i>Juniperus</i> sp.	<i>J. horizontalis</i> 'Wiltonii'	Field Container	Fraelich	2006	Over the top	No injury or growth reduction at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061211b.pdf
26561	Crape Myrtle	<i>Lagerstroemia indica</i>		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
26621	Crape Myrtle	<i>Lagerstroemia indica</i>	<i>L. x Tuscarora</i>	Field Container	Neal	2006	Over the top	No injury at 0.125, 0.25, and 0.5 lb ai per acre.	20070225f.pdf
25379	Shrub Verbena	<i>Lantana</i> sp.		Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061110l.pdf
25364	Lily, Easter	<i>Lilium longiflorum</i>	'Nellie White'	Field Container	Lieth	2006	Over the top	Unacceptable injury and growth reduction at 0.125, 0.25 and 0.50 lb ai per acre	20070717g.pdf
24745	Lilyturf, Creeping	<i>Liriope</i> sp.	<i>L. muscari variegata</i>	Field Container	Neal	2006	Over the top	Slight transient injury at 0.125 lb ai per acre and moderate unacceptable injury at 0.25 and 0.5 lb ai per acre.	20070225f.pdf
24745	Lilyturf, Creeping	<i>Liriope</i> sp.	<i>L. muscari variegata</i> 'Aztec'	Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061110l.pdf
24745	Lilyturf, Creeping	<i>Liriope</i> sp.	<i>L. muscari variegata</i> 'Aztec'	Field Container	Derr	2007	Over the top	Slight injury at 0.125, 0.25 and 0.5 lb ai per acre.	20071219d.pdf
26557	Magnolia, Southern	<i>Magnolia grandiflora</i>		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25380	Mondo Grass, Lilyturf, Ker-Gawl	<i>Ophiopogon</i> sp.	<i>O. japonicus variegata</i>	Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061110l.pdf
25381	Pentas	<i>Pentas</i> sp.	'Ruby Red'	Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	2006110l.pdf
25368	Spruce, Norway	<i>Picea abies</i>		Field Container	Altland	2006	Over the top	No injury at 0.125, 0.25, and 0.5 lb ai per acre.	20070110p.pdf
25369	Cherry (Non-Bearing)	<i>Prunus</i> sp.	<i>P. avium</i>	Field Container	Altland	2006	Over the top	No significant visible injury, but caliper was decreased at the two higher rates (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25924	Cherry (Non-Bearing)	Prunus sp.	P. serotina	Field In-Ground	Beste/Frank	2006	Over the top	Slight injury and growth reduction at all rates (0.125, 0.25 and 0.5 lb ai per acre); no reduction in seedling marketability	20070412d.pdf
25357	Fir, Douglas	Pseudotsuga menziesii		Field Container	Altland	2006	Over the top	No significant injury at 0.125, 0.25, and 0.5 lb ai per acre.	20070110p.pdf
25357	Fir, Douglas	Pseudotsuga menziesii		Field Container	Lieth	2007	Over the top	No significant injury at 0.125 and 0.25, but at 0.5 lb ai per acre chlorotic shoot tips and necrotic needles were observed.	20080227m.pdf
25357	Fir, Douglas	Pseudotsuga menziesii		Field Container	Boydston	2006	Over the top	No injury or growth differences at 0.125, 0.25, and 0.5 lb ai per acre.	20061009b.pdf
25357	Fir, Douglas	Pseudotsuga menziesii		Field Container	Boydston	2007	Over the top	No injury or growth reduction at 0.125, 0.25 and 0.5 lb ai per acre	20071120i.pdf
25357	Fir, Douglas	Pseudotsuga menziesii	P. menziesii glauca	Field Container	Freiberger	2007	Over the top	Slight injury at 0.125, slight to moderate at 0.25 and 0.5 lb ai per acre	20080227l.pdf
25460	Oak, Northern Red	Quercus rubra		Field Container	Altland	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070110p.pdf
25460	Oak, Northern Red	Quercus rubra		Field Container	Fraelich	2006	Over the top	Slight, transient injury only at 0.5 lb ai per acre rate with no growth reduction.	20061211j.pdf
25919	Oak, Northern Red	Quercus rubra		Field In-Ground	Beste/Frank	2006	Ground broadcast foliar	No significant injury or plant size reduction at 0.125, 0.25 and 0.5 lb ai per acre; all plants marketable	20070307c.pdf
24533	Azalea, & Rhododendron	Rhododendron sp.	'Amelia Rose'	Field Container	Gilliam	2007	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre	20071219j.pdf
24533	Azalea, & Rhododendron	Rhododendron sp.	'Congo'	Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf
24533	Azalea, & Rhododendron	Rhododendron sp.	'Girard Rose'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111l.pdf
24533	Azalea, & Rhododendron	Rhododendron sp.	'Pink Gumpo'	Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf



PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
24533	Azalea, & Rhododendron	Rhododendron sp.	R. catawbiense 'English Roseum'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111m.pdf
24533	Azalea, & Rhododendron	Rhododendron sp.	R. x 'Roseum Elegans'	Field Container	Mathers	2006	Over the top	Virtually no injury to slight injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre).	20070110l.pdf
25935	Azalea, & Rhododendron	Rhododendron sp.	R. x 'Roseum Elegans'	Field In-Ground	Mathers	2006	Over the top	Slight to moderate injury increasing with rate and with second application (0.125, 0.25, 0.5 lb ai per acre)	20070110l.pdf
25935	Azalea, & Rhododendron	Rhododendron sp.	Rhododendron 'P.J.M.'	Field In-Ground	Ahrens/Mervosh	2006	Over the top	No injury at 0.125 lb ai per acre, slight at 0.25 and 0.5 lb ai	20070418f.pdf
24533	Azalea, & Rhododendron	Rhododendron sp.	'Tradition'	Field Container	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25360	Rose	Rosa sp.		Field Container	Senesac	2006		Virtually no injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061108g.pdf
25360	Rose	Rosa sp.	'Beloved'	Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf
25360	Rose	Rosa sp.	'Moonshadow'	Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf
25360	Rose	Rosa sp.	'Nearly Wild'	Field Container	Lieth	2006	Over the top	High injury and growth reduction at all rates; plants unmarketable (0.125, 0.25, 0.5 lb ai per acre).	20061201b.pdf
25360	Rose	Rosa sp.	'Oranges & Lemons'	Field Container	Mathers	2006	Over the top	Slight to moderate injury after first application with only very slight injury after second (0.125, 0.25, 0.5 lb ai per acre).	20070110l.pdf
25360	Rose	Rosa sp.	'Solstice'	Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf
25370	Coneflower, Orange	Rudbeckia fulgida speciosa	'Becky'	Field Container	Derr	2006	Over the top	No significant injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	2006110l.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25370	Coneflower, Orange	Rudbeckia fulgida speciosa	'Viettas Little Suzie'	Field Container	Mathers	2006	Over the top	Very slight injury at 0.125 lb ai per acre even with second application; moderate, transient injury at 0.25 lb ai per acre; and moderate persisting injury with 0.5 lb ai per acre.	20070110l.pdf
25371	Sage, Ramona	Salvia sylvestris	S. elegans 'Tangerine'	Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	2006110l.pdf
25371	Sage, Ramona	Salvia sylvestris	S. nemorosa 'May Night'	Field Container	Lieth	2006	Over the top	No significant injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061201f.pdf
25371	Sage, Ramona	Salvia sylvestris	S. nemorosa 'Snow Hill'	Field Container	Boydston	2006	Over the top	Significant injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20061109c.pdf
25361	Bridal-Wreath	Spiraea sp.	'Goldflame'	Field Container	Ahrens/Mervosh	2006	Over the top	Significant injury after the 1st but not after the 2nd application at all rates (0.125, 0.25 and 0.5 lb ai/A)	20070418a.pdf
25361	Bridal-Wreath	Spiraea sp.	S. bumalda 'Anthony Waterer'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111o.pdf
25361	Bridal-Wreath	Spiraea sp.	S. decumbens	Field Container	Senesac	2006	Over the top	No injury at 0.125 lb ai per acre; very slight, transient injury at 0.25 and 0.5 lb ai per acre after second application	20061108g.pdf
25361	Bridal-Wreath	Spiraea sp.	S. japonica 'Little Princess'	Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
25361	Bridal-Wreath	Spiraea sp.	S. x bumalda 'Gold Mound'	Field Container	Derr	2006	Over the top	No injury at all rates (0.125, 0.25, 0.5 lb ai per acre)	2006110l.pdf
25361	Bridal-Wreath	Spiraea sp.	S. x bumalda 'Goldmound'	Field Container	Mathers	2006	Over the top	Slight transient injury at all rates (0.125, 0.25, 0.5 lb ai per acre).	20070110l.pdf
25361	Bridal-Wreath	Spiraea sp.	S. x bumalda 'Goldmound'	Field Container	Mathers	2006	Over the top	Very slight transient injury at high rate only (0.125, 0.25, 0.5 lb ai per acre)	20070110l.pdf
26553	Bald Cypress	Taxodium distichum		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25362	Arborvitae	Thuja sp.	'Emerald Green'	Field Container	Ahrens/Mervosh	2006	Over the top	No injury at all rates (0.125, 0.25 and 0.5 lb ai per acre)	20070418b.pdf
26566	Arborvitae	Thuja sp.	T. occidentalis	Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25362	Arborvitae	Thuja sp.	T. occidentalis 'Elegantissima'	Field Container	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
25362	Arborvitae	Thuja sp.	T. occidentalis 'Emerald Green'	Field Container	Lieth	2006	Over the top	No injury or growth reduction at all rates (0.125, 0.25, 0.5 lb ai per acre)	20061201c.pdf
25356	Jasmine, Asian	Trachelospermum asiaticum		Field Container	Gilliam	2006	Over the top	No injury or growth reduction at 0.125, 0.25, and 0.5 lb ai per acre.	20070212a.pdf
25356	Jasmine, Asian	Trachelospermum asiaticum	'Green'	Field Container	Fraelich	2006	Over the top	No injury or growth reduction at all rates (0.125, 0.25, 0.5 lb ai per acre)	20061211e.pdf
26570	Palm, Windmill	Trachycarpus fortunei		Field In-Ground	Czarnota	2006	Over the top	No injury at 0.25 and 0.38 lb ai per acre.	20070225c.pdf
25451	Viburnum, arrowwood	Viburnum dentatum	'Autum Jazz'	Field Container	Altland	2006	Over the top	No significant injury at any rate (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf
25451	Viburnum, arrowwood	Viburnum dentatum	'Chicago Lustre'	Field Container	Beste/Frank	2006	Over the top	No significant injury or growth reduction at all rates (0.125, 0.25 and 0.5 lb ai/A); all plants marketable	20070111r.pdf
26501	Arrowwood	Viburnum sp.	V. carlesii	Field Container	Altland	2006	Over the top	No significant injury at any rate (0.125, 0.25, 0.5 lb ai per acre).	20070110p.pdf
26501	Arrowwood	Viburnum sp.	V. tinus compacta	Field Container	Neal	2006	Over the top	No significant injury at 0.125, 0.25, 0.5 lb ai per acre.	20070225f.pdf
25018	Periwinkle	Vinca sp.	V. minor	Field Container	Freiberger	2007	Over the top	No injury at 0.125 and 0.25 lb ai per acre, slight injury at 0.5 lb only after 2nd application	200802271.pdf
25018	Periwinkle	Vinca sp.	Vinca minor 'Bowles'	Field Container	Lieth	2006	Over the top	Not possible to determine if product caused injury as untreated plants showed substantial injury	20061201e.pdf

## Label Suggestions

For Sulfentrazone 4F, it is suggested that the initial label be quite restrictive with over-the-top applications along with fully listing those species exhibiting sensitivity to treatment. The following species should be added to the label for those materials grown in containers:

*Abies fraseri*

*Buxus sp.*

*Ilex vomitoria 'nana'*

*Juniperus horizontalis*

*Rosa sp.*

*Thuja sp.*

For Sulfentrazone 0.2G, it is suggested that all 23 crop genera or species exhibiting no injury in the testing with Sulfentrazone 0.2G be placed on this label with over-the-top applications.

*Abies fraseri*

*Acer rubrum*

*Buxus microphylla*

*Chamaebatiaria sp.*

*Delosperma sp.*

*Gardenia augusta radicans*

*Helleborus niger*

*Quercus rubra*

*Rhododendron sp.*

*Rosa sp. (See Lieth 2006)*

*Spiraea x bumalda*

*Thuja occidentalis*

In addition, adding the following species and genera to the label can be considered even though there are fewer than three sites because of the breadth of species treated or that applications with Sulfentrazone 4F did not cause phytotoxicity.

*Euonymus alatus*<sup>2</sup>

*Euonymus japonicus*<sup>2</sup>

*Euonymus patens*<sup>2</sup>

*Ilex cornuta*<sup>2</sup>

*Ilex crenata*<sup>2</sup>

*Ilex rotunda*<sup>2</sup>

*Ilex x meserveae*<sup>2</sup>

*Ilex vomitoria 'nana'*<sup>2</sup>

*Juniperus horizontalis*

*Spiraea decumbent s*<sup>2</sup>

*Spiraea japonica*<sup>2</sup>

*Viburnum carlesii*<sup>2</sup>

*Viburnum tinus*<sup>2</sup>

It is also suggested that growers be cautioned not to use Sulfentrazone 0.2G over the top of the following three crops: *Canna sp.*, *Echinacea purpurea*, and *Hosta sp.*

## **Appendix 1: Protocols**

## Phytotoxicity to ornamental horticulture plants from tools to manage broadleaf weeds and sedges.

### Ornamental Protocol Number: 06-010

**Objective:** Determine phytotoxicity of Manage (halosulfuron), Sulfentrazone 0.2G, and V-10142 to unlabelled perennial plants commonly grown in nurseries.

### Experimental Design:

**Plot Size:** Must be adequate to reflect actual use conditions.

**Replicates:** Minimum of 3 replications (preferably 4) with 3 plants per replicate

**Application Instructions:** Apply first application over the top of plants just breaking dormancy or, under climates where plants do not go totally dormant, apply prior to active growth in the spring. See table for product specific information.

**Plant Materials:** See attached list of plant materials. Plants grown in field containers are preferred to in-ground.

**Evaluations:** Record plant height & width at initial and final evaluations. At 1, 2, and 4 weeks after each application, record phytotoxicity on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill). If appropriate, also include ratings for chlorosis, defoliation, stunting or other growth effects on a scale of 0 to 10 (0 = No effect; 10 = Complete plant affected). If any phytotoxicity is observed in treated plants, take pictures comparing treated and untreated plant material.

*If different application methods or evaluations are made, please clearly specify differences in final report and explain how they enhanced results.*

**Recordkeeping:** Keep detailed records of weather conditions including temperature and precipitation, soil-type or soil-less media, application equipment, irrigation, liner size, plant height & width, and plant growth stage at application and data collection dates.

### Treatments:

Product	Rate	Special Instructions	Contact Information to obtain materials and any needed adjuvants
Sedgehammer 75WG (halosulfuron)	1 oz per acre (0.047 lb ai)	Always use 0.25% v/v of a non ionic surfactant. If severe phyto symptoms do not occur and where feasible apply a second application 4-6 weeks later at identical rates.	Kory Wheeler 928-819-1592 <a href="mailto:Kwheeler@gowanco.com">Kwheeler@gowanco.com</a>
	2 oz per acre (0.094 lb ai)		
	4 oz per acre (0.188 lb ai)		
Sulfentrazone 0.2G (sulfentrazone – 0.2% active)	0.125 lb ai/acre	2 applications on a 4 week interval	FMC, Bobby Walls, 919-735-3862, <a href="mailto:bobby_walls@fmc.com">bobby_walls@fmc.com</a>
	0.25 lb ai/acre		
	0.5 lb ai/acre		
V-10142 75WG	0.5 lb ai/acre	2 applications on a 4 week interval	Valent, Joe Chamberlin, 770-985-0303, <a href="mailto:jcham@valent.com">jcham@valent.com</a>
	1.0 lb ai/acre		
	2.0 lb ai/acre		
Untreated	--	--	
<b>Comparison Treatment</b>			
Sulfentrazone 4F	4 fl oz per acre (0.125 lb ai/acre)	2 applications on a 4 week interval	FMC, Bobby Walls, 919-735-3862, <a href="mailto:bobby_walls@fmc.com">bobby_walls@fmc.com</a>
	8 fl oz per acre (0.25 lb ai/acre)		
	16 fl oz per acre (0.5 lb ai/acre)		

### Reports:

Reports must include:

- Results summary (no more than one page)
- Summary table with appropriate statistical analyses
- Experimental design and materials and methods
- Appendices: raw data and recordkeeping information as listed above
- If pictures were taken, please include them.

A report submitted electronically is preferred but not required. If the report is provided electronically, the basic report can be sent in MS Word or WordPerfect, the recordkeeping information as pdf or other electronic documents, and the raw data in MS Excel or other suitable program such as ARM.

**Please direct questions to:** Cristi Palmer, IR-4 HQ, Rutgers University, 681 US Hwy 1 S, North Brunswick, NJ 08902-3390, Phone 732-932-9575 x629, [palmer@aesop.rutgers.edu](mailto:palmer@aesop.rutgers.edu) OR Ely Vea, 308 Aston Forest Lane, Crownsville, MD 21032, Phone & FAX#: 410-923-4880, E-mail: [evvea@comcast.net](mailto:evvea@comcast.net).

Draft Date: 3/15/06  
Revised By: CLP

## Phytotoxicity to ornamental horticulture plants from tools to manage broadleaf weeds and sedges.

### Ornamental Protocol Number: 07-011

**Objective:** Determine phytotoxicity of Sedgehammer (halosulfuron), Sulfentrazone 0.2G, and V-10142 to unlabelled perennial plants commonly grown in nurseries.

### Experimental Design:

**Plot Size:** Must be adequate to reflect actual use conditions.

**Replicates:** Minimum of 3 replications (preferably 4) with 3 plants per replicate

**Application Instructions:** Apply first application over the top of plants just breaking dormancy or, under climates where plants do not go totally dormant, apply prior to active growth in the spring. For V-10142 75WG, apply directed spray instead of over the top. See table for product specific information.

**Plant Materials:** *Contact your Regional Coordinator for an up-to-date list.* Plants grown in field containers are preferred to in-ground.

**Evaluations:** Record plant height & width at initial and final evaluations. At 1, 2, and 4 weeks after each application, record phytotoxicity on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill). If appropriate, also include ratings for chlorosis, defoliation, stunting or other growth effects on a scale of 0 to 10 (0 = No effect; 10 = Complete plant affected). If any phytotoxicity is observed in treated plants, take pictures comparing treated and untreated plant material.

*If different application methods or evaluations are made, please clearly specify differences in final report and explain how they enhanced results.*

**Recordkeeping:** Keep detailed records of weather conditions including temperature and precipitation, soil-type or soil-less media, application equipment, irrigation, liner size, plant height & width, and plant growth stage at application and data collection dates.

### Treatments:

Product	Rate	Special Instructions	Contact Information to obtain materials and any needed adjuvants
Sedgehammer 75WG (halosulfuron)	1 oz per acre (0.047 lb ai)	Always use 0.25% v/v of a non ionic surfactant. If severe phyto symptoms do not occur and where feasible apply a second application 4-6 weeks later at identical rates.	Gowan, Julie Butcher, 928-819-1578, <a href="mailto:jbutcher@gowanco.com">jbutcher@gowanco.com</a>
	2 oz per acre (0.094 lb ai)		
	4 oz per acre (0.188 lb ai)		
Sulfentrazone 0.2G (sulfentrazone – 0.2% active)	0.125 lb ai/acre	2 applications on a 4 week interval	FMC, Bobby Walls, 919-735-3862, <a href="mailto:bobby_walls@fmc.com">bobby_walls@fmc.com</a>
	0.25 lb ai/acre		
	0.5 lb ai/acre		
Sulfentrazone 4F	4 fl oz per acre (0.125 lb ai/acre)	2 applications on a 4 week interval	FMC, Bobby Walls, 919-735-3862, <a href="mailto:bobby_walls@fmc.com">bobby_walls@fmc.com</a>
	8 fl oz per acre (0.25 lb ai/acre)		
	16 fl oz per acre (0.5 lb ai/acre)		
V-10142 0.5G	150 lb per acre (0.75 lb ai/acre)	2 over the top applications on a 4 week interval Apply 0.5" of irrigation immediately after application	Valent, Joe Chamberlin, 770-985-0303, <a href="mailto:jcham@valent.com">jcham@valent.com</a>
	300 lb per acre (1.5 lb ai/acre)		
	600 lb per acre (3.0 lb ai/acre)		
V-10142 75WG + surfactant	1 lb per acre (0.75 lb ai/acre)	Only evaluate as directed spray on large shrubs or trees. Do not contact foliage with sprays. 2 directed applications on a 4 week	Valent, Joe Chamberlin, 770-985-0303, <a href="mailto:jcham@valent.com">jcham@valent.com</a>
	2 lb per acre (1.5 lb ai/acre)		



	4 lb per acre (2.0 lb ai/acre)	interval Apply 0.5" of irrigation immediately after application	
Untreated	--	--	

**Reports:**

Reports submitted on the standard IR-4 Ornamental Horticulture Research Report Form are preferred.

A report submitted electronically is preferred but not required. If the report is provided electronically, the basic report can be sent in MS Word or WordPerfect, the recordkeeping information as pdf or other electronic documents, and the raw data in MS Excel or other suitable program such as ARM.

**Please direct questions to:** Cristi Palmer, IR-4 HQ, Rutgers University, 500 College Road East, Suite 201W, Princeton, NJ 08540, Phone 732-932-9575 x4629, [palmer@aesop.rutgers.edu](mailto:palmer@aesop.rutgers.edu).

Draft Date: 3/8/07  
Revised By: CLP

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### **Appendix 3: Submitted Data**

Researcher reports included in the printed copy of this report and those received by 4/29/09.  
Reports on following pages are in alphanumeric order of author PR number.