

**IR-4 Ornamental Horticulture Program
V-10142 75WDG Crop Safety**

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Abstract

During 2006 IR-4 conducted 133 trials with V-10142 75WDG (imzasulfuron) on 50 crops. This research was undertaken to determine the level of crop safety V-10142 75WDG has when used as over-the-top applications. The imzasulfuron rates were 0.5, 1.0 and 2.0 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Fifty different genera and species were examined. Of these, only 9 exhibited no or minimal transient injury after application at all three rates. Three crops exhibited no phytotoxicity at 0.5 lb ai per acre, but did have some injury at the higher rates. Nineteen species exhibited phytotoxicity at even the 0.5 lb ai per acre rate.

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. Three herbicides, SedgeHammer, Sulfentrazone, and V-10142 75WDG, were chosen for 2006 research activities into level of crop safety on over 50 different plant species. This summary covers the results from V-10142 75WDG during 2006.

Materials and Methods

Two applications of V-10142 75WDG (imzasulfuron) were made approximately 30 days apart. The application rates were 2, 4, and 8 lb ai per A, 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.

V-10142 75WDG was supplied to researchers (See list of researchers in Appendix 2) by Valent.

Results and Summary

Phytotoxicity

Based on the type and nature of injury seen with V-10142 75WDG applications in the research conducted in 2006, tested plant species were placed into three 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, 4) more data is needed to make informed recommendations.

Out of the 46 genera/species tested through IR-4, only 9 exhibited no or minimal negative impact on a wide range of plant species (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. The only species where this seemed to apply was for certain rose cultivars (Table 2). Seventeen crops exhibited damage sufficient to recommend growers not utilize V-10142 75WDG as an over-the-top treatment (Table 3). Nineteen crops require additional data points to clarify recommendations (Table 4). Of these, three crops did exhibit no or minimal transitory injury in two trials. At least one more data point for each is recommended prior to adding these to the label.

Please see Table 5 for a list of individual trial summaries on V-10142 75WDG.

Table 1. List of V-10142 75WDG treated crops with no or minimal transitory injury.

| | |
|-------------------------|--|
| <i>Buxus sp.</i> | <i>Ilex vomitoria 'nana'</i> |
| <i>Ilex cornuta</i> | <i>Quercus rubra</i> |
| <i>Ilex crenata</i> | <i>Rhododendron sp. (see Senesac 2006)</i> |
| <i>Ilex rotunda</i> | <i>Trachelospermum jasminoides</i> |
| <i>Ilex x meserveae</i> | |

Table 2. List of V-10142 75WDG treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity

| | | |
|-----------------------|-------------------------|-------------------|
| <i>Delosperma sp.</i> | <i>Helleborus niger</i> | <i>Rosa sp. *</i> |
|-----------------------|-------------------------|-------------------|

* variable responses among cultivars, in general rose appeared to not be impacted but some cultivars were

Table 3. List of V-10142 75WDG treated crops exhibiting significant injury.

| | |
|----------------------------------|------------------------------------|
| <i>Abelia X grandiflora</i> | <i>Hemerocallis sp.</i> |
| <i>Abies fraseri</i> | <i>Hydrangea macrophylla</i> |
| <i>Acer rubrum</i> | <i>Liriope sp.</i> |
| <i>Chamaebatiaria sp.</i> | <i>Prunus avium</i> |
| <i>Cotoneaster dammeri</i> | <i>Rudbeckia fuligida speciosa</i> |
| <i>Cotoneaster horizontalis</i> | <i>Salvia elegans</i> |
| <i>Echinacea sp.</i> | <i>Salvia nemorosa</i> |
| <i>Echinacea purpurea magnus</i> | <i>Spiraea sp.</i> |
| <i>Gypsophila elegans</i> | <i>Viburnum sp.</i> |
| <i>Hedera helix</i> | |

Table 4. List of V-10142 75WDG treated crops where more information is needed.

| | |
|------------------------------|------------------------------|
| <i>Cuphea sp.</i> | <i>Pentas sp.</i> |
| <i>Euonymus sp.</i> | <i>Picea abies</i> |
| <i>Gardenia radicans*</i> | <i>Pinus sp.</i> |
| <i>Hosta sp.</i> | <i>Pseudotsuga menziesii</i> |
| <i>Illicium sp.</i> | <i>Taxodium distichum</i> |
| <i>Juniperus sp.</i> | <i>Taxus sp.</i> |
| <i>Lagerstroemia indica*</i> | <i>Thuja sp.</i> |
| <i>Lantana sp.</i> | <i>Trachycarpus fortunei</i> |
| <i>Magnolia grandiflora</i> | <i>Vinca sp. *</i> |
| <i>Ophiopogon japonicus</i> | |

* no or minimal transient injury in the reported trials.

Table 5. Detailed Summary of 2006 Crop Safety Testing with V-10142 75WG

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 4/15/07 are listed below.

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|-------------|---------------------------|---------------------------------------|-----------------|----------------|------|------------------|--|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25412 | Abelia | <i>Abelia sp.</i> | A. x grandiflora 'John Creech' | Field Container | Neal | 2006 | Over the top | Significant unacceptable injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25412 | Abelia | <i>Abelia sp.</i> | A. x grandiflora 'Little Richard' | Field Container | Gilliam | 2006 | Over the top | Moderate to significant injury increasing with rate (0.5, 1.0, 2.0 lb ai per acre). |
| 25401 | Fir, Fraser | <i>Abies fraseri</i> | | Field Container | Altland | 2006 | Over the top | Significant injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25401 | Fir, Fraser | <i>Abies fraseri</i> | | Field Container | Freiberger | 2006 | Over the top | Slight injury after 1st, high after 2nd application at all rates (0.5, 1 and 2 lb ai per acre); some growth reduction |
| 25938 | Fir, Fraser | <i>Abies fraseri</i> | | Field In-Ground | Ahrens/Mervosh | 2006 | Over the top | No injury to dormant trees, unacceptable injury to actively growing trees at all rates (0.5, 1 and 2 lb ai per acre) |
| 25390 | Maple, Red | <i>Acer rubrum</i> | | Field Container | Altland | 2006 | Over the top | Significant injury with single application at 2X and 4X rates (1 and 2 lb ai/A) |
| 25390 | Maple, Red | <i>Acer rubrum</i> | | Field Container | Fraelich | 2006 | Over the top | No injury at 0.5 lb ai per acre, very slight at 2X and 4X rates; no growth reduction |
| 25390 | Maple, Red | <i>Acer rubrum</i> | | Field Container | Freiberger | 2006 | Over the top | Slight injury after 1st, moderate after 2nd application at all rates (0.5, 1 and 2 lb ai per acre) |
| 25918 | Maple, Red | <i>Acer rubrum</i> | | Field In-Ground | Beste/Frank | 2006 | Ground Broadcast | Significant injury and growth reduction at 0.5, 1 and 2 lb ai per acre |
| 25384 | Boxwood | <i>Buxus sp.</i> | B. microphylla asiaticum 'Winter Gem' | Field Container | Fraelich | 2006 | Over the top | No injury but moderate stunting at all rates (0.5, 1 and 2 lb ai/A). |
| 25384 | Boxwood | <i>Buxus sp.</i> | B. microphylla 'Green Beauty' | Field Container | Wilén | 2006 | Over the top | Acceptable injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25384 | Boxwood | <i>Buxus sp.</i> | B. microphylla 'Green Velvet' | Field Container | Beste/Frank | 2006 | Over the top | Slight injury but no growth reduction at all rates (0.5, 1 and 2 lb ai/A) by trial's end; plants marketable |
| 25384 | Boxwood | <i>Buxus sp.</i> | B. microphylla var. koreana | Field Container | Gilliam | 2006 | Over the top | Very slight to moderate injury increasing with rate along with a reduction in plant size (0.5, 1.0, 2.0 lb ai per acre). |
| 25384 | Boxwood | <i>Buxus sp.</i> | 'Green Mountain' | Field Container | Mathers | 2006 | Over the top | Slight injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25400 | Fernbush | <i>Chamaebatiaria sp.</i> | | Field Container | Klett | 2006 | Over the top | Experiment A: No significant injury after 1st application at all rates (0.5, 1 and 2 lb ai per acre), slight to moderate after 2nd application |

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|--|----------------------------|------------------------------------|-----------------|----------------|------|------------------|---|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25400 | Fernbush | <i>Chamaebatiaria sp.</i> | | Field Container | Klett | 2006 | Over the top | Experiment B: Moderate to high injury with increasing rates (0.5, 1 and 2 lb ai per acre) |
| 25400 | Fernbush | <i>Chamaebatiaria sp.</i> | | Field Container | Klett | 2006 | Over the top | Experiment C: Moderate injury at all rates (0.5, 1 and 2 lb ai per acre) |
| 25415 | Cotoneaster | <i>Cotoneaster sp.</i> | C. dammeri 'Skolghshomen' | Field Container | Beste/Frank | 2006 | Over the top | Significant injury and growth reduction at all rates (0.5, 1 and 2 lb ai/A); market value reduced |
| 25415 | Cotoneaster | <i>Cotoneaster sp.</i> | C. horizontalis | Field Container | Neal | 2006 | Over the top | Significant injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25404 | Mexican Heather, False Heather, Elfin Herb | <i>Cuphea hyssopifolia</i> | C. allyson | Field Container | Derr | 2006 | Over the top | Slight injury increasing with rate (0.5, 1 and 2 lb ai/A). |
| 25404 | Mexican Heather, False Heather, Elfin Herb | <i>Cuphea hyssopifolia</i> | C. hyssopifolia 'Itsy Bitsy White' | Field Container | Lieth | 2006 | Over the top | High injury and growth reduction at all rates (0.5, 1 and 2 lb ai/A) and plants were unmarketable |
| 25397 | Delosperma sp. | <i>Delosperma sp.</i> | 'Kelaidis' | Field Container | Klett | 2006 | Over the top | Experiment A: No significant injury at 0.5 lb ai per acre, moderate to high at 1 and 2 lb ai |
| 25397 | Delosperma sp. | <i>Delosperma sp.</i> | 'Kelaidis' | Field Container | Klett | 2006 | Over the top | Experiment B: No significant injury at 0.5 lb ai per acre, moderate at 1 and 2 lb ai |
| 25397 | Delosperma sp. | <i>Delosperma sp.</i> | 'Kelaidis' | Field Container | Klett | 2006 | Over the top | Experiment C: Slight transient injury at 0.5 lb ai per acre, moderate to high at 1 and 2 lb ai |
| 25417 | Purple Coneflower | <i>Echinacea sp.</i> | | Field Container | Klett | 2006 | Over the top | Experiment A: Moderate to high injury at all rates (0.5, 1 and 2 lb ai per acre) |
| 25417 | Purple Coneflower | <i>Echinacea sp.</i> | | Field Container | Klett | 2006 | Over the top | Experiment B: No significant injury after 1st application at all rates (0.5, 1 and 2 lb ai per acre, moderate after 2nd application at 1 and 2 lb ai |
| 25417 | Purple Coneflower | <i>Echinacea sp.</i> | | Field Container | Klett | 2006 | Over the top | Experiment C: Slight to high injury at all rates (0.5, 1 and 2 lb ai per acre) |
| 25417 | Purple Coneflower | <i>Echinacea sp.</i> | E. purpurea magnus | Field Container | Fraelich | 2006 | Over the top | Very slight, transient injury at 0.5 lb ai per acre, slight at 1.0 lb ai per acre, moderate at 2.0 lb ai per acre; no stunting at 0.5 and 1.0 lb ai per acre, moderate at 2.0 lb ai per acre. |
| 25417 | Purple Coneflower | <i>Echinacea sp.</i> | E. purpurea 'Magnus' | Field Container | Boydston | 2006 | Over the top | Trial 1: Significant injury and growth reduction at all rates (0.5, 1 and 2 lb ai/A). |
| 25417 | Purple Coneflower | <i>Echinacea sp.</i> | E. purpurea 'Magnus' | Field Container | Boydston | 2006 | Over the top | Trial 2: Severe injury and growth reduction at all rates (0.5, 1 and 2 lb ai/A). |
| 25399 | Euonymus | <i>Euonymus sp.</i> | E. alata 'Compacta' | Field Container | Mathers | 2006 | Over the top | Very slight to slight injury increasing with rate (0.5, 1 and 2 lb ai/A). |
| 25399 | Euonymus | <i>Euonymus sp.</i> | E. alatus 'Compactus' | Field Container | Ahrens/Mervosh | 2006 | Over the top | Unacceptable injury at all rates (0.5, 1 and 2 lb ai per acre) |
| 25399 | Euonymus | <i>Euonymus sp.</i> | E. fortunei 'Gracilis' | Field Container | Lieth | 2006 | Over the top | Very slight injury but over 40% growth reduction at all rates (0.5, 1 and 2 lb ai/A) |

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|--|------------------------------------|---------------------------------|-----------------|---------------|------|------------------|--|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25399 | Euonymus | <i>Euonymus sp.</i> | E. japonicus 'Aureo Marginatus' | Field Container | Wilén | 2006 | Over the top | Moderate injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25399 | Euonymus | <i>Euonymus sp.</i> | E. patens 'Manhattan' | Field Container | Beste/Frank | 2006 | Over the top | No significant injury or growth reduction at all rates (0.5, 1 and 2 lb ai/A) by trial's end; plants marketable |
| 26080 | Ash, Green | <i>Fraxinus pennsylvanica</i> | | Field In-Ground | Beste/Frank | 2006 | Over the top | Slight injury and moderate growth reduction at all rates (0.5, 1 and 2 lb ai per acre); reduced market value at 2X and 4x |
| 25419 | Cape Jasmine, Radicans | <i>Gardenia augusta 'Radicans'</i> | | Field Container | Derr | 2006 | Over the top | No injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25419 | Cape Jasmine, Radicans | <i>Gardenia augusta 'Radicans'</i> | 'Radicans' | Field Container | Fraelich | 2006 | Over the top | Slight, transient injury at 1 and 2 lb ai per acre; slight stunting at 0.5 lb ai per acre, moderate at 1 and 2 lb ai per acre. |
| 25386 | Baby's-Breath | <i>Gypsophila elegans</i> | | Field Container | Senesac | 2006 | Over the top | High injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25418 | English Ivy | <i>Hedera helix L. ssp. Helix</i> | | Field Container | Boydston | 2006 | Over the top | Severe injury and growth reduction at all rates (0.5, 1 and 2 lb ai/A). |
| 25418 | English Ivy | <i>Hedera helix L. ssp. Helix</i> | 'Glacier ivy' | Field Container | Fraelich | 2006 | Over the top | Severe injury and stunting at all rates (0.5, 1 and 2 lb ai/A). |
| 25402 | Hellebore, Christmas rose, Lenten Rose | <i>Helleborus niger</i> | | Field Container | Klett | 2006 | Over the top | Experiment A: No significant injury at all rates (0.5, 1 and 2 lb ai per acre) |
| 25402 | Hellebore, Christmas rose, Lenten Rose | <i>Helleborus niger</i> | | Field Container | Klett | 2006 | Over the top | Experiment B: No significant injury at all rates (0.5, 1 and 2 lb ai per acre) |
| 25402 | Hellebore, Christmas rose, Lenten Rose | <i>Helleborus niger</i> | | Field Container | Klett | 2006 | Over the top | Experiment C: No significant injury after 1st application at all rates (0.5, 1 and 2 lb ai per acre), light to moderate injury after 2nd application at 2X and 4X |
| 25395 | Daylily | <i>Hemerocallis sp.</i> | H. hybrida | Field Container | Fraelich | 2006 | Over the top | Slight injury at 0.5 lb ai per acre, severe at 1 and 2 lb ai per acre; growth reduction at higher rates |
| 25395 | Daylily | <i>Hemerocallis sp.</i> | 'Stella de Oro' | Field Container | Beste/Frank | 2006 | Over the top | Unacceptable injury and growth reduction at all rates (0.5, 1 and 2 lb ai/A) |
| 25395 | Daylily | <i>Hemerocallis sp.</i> | 'Stella de Oro' | Field Container | Lieth | 2006 | Over the top | High injury at all rates (0.5, 1 and 2 lb ai/A); plants unmarketable |
| 25395 | Daylily | <i>Hemerocallis sp.</i> | 'Stella d'Oro' | Field Container | Mathers | 2006 | Over the top | Slight to moderate injury increasing with rate after first application, but moderate injury was observed after second application at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25403 | Hosta | <i>Hosta sp.</i> | 'Gold Standard' | Field Container | Fraelich | 2006 | Over the top | Moderate injury and stunting at 0.5 lb ai per acre, severe at 1 and 2 lb ai per acre. |

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|---------------------|------------------------------|----------------------------------|-----------------|---------------|------|------------------|---|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25403 | Hosta | <i>Hosta sp.</i> | H. plantanginea 'Royal Standard' | Field Container | Gilliam | 2006 | Over the top | Very slight injury at all rates and a reduction in plant size (0.5, 1.0, 2.0 lb ai per acre). |
| 25387 | Hydrangea, French | <i>Hydrangea macrophylla</i> | 'Nikko Blue' | Field Container | Lieth | 2006 | Over the top | High injury at all rates (0.5, 1 and 2 lb ai/A); plants unmarketable |
| 25388 | Holly | <i>Ilex sp.</i> | I. cornuta 'bufordii nana' | Field Container | Neal | 2006 | Over the top | No significant injury at 0.5, 1.0 and 2.0 lb ai per acre. |
| 25388 | Holly | <i>Ilex sp.</i> | I. cornuta 'Carissa' | Field Container | Fraelich | 2006 | Over the top | No injury or growth reduction at all rates (0.5, 1 and 2 lb ai/A). |
| 25388 | Holly | <i>Ilex sp.</i> | I. crenata 'Compacta' | Field Container | Beste/Frank | 2006 | Over the top | No injury or growth reduction at all rates (0.5, 1 and 2 lb ai/A) by trial's end; plants marketable |
| 26586 | Holly | <i>Ilex sp.</i> | I. rotunda | Field In-Ground | Czarnota | 2006 | Over the top | Very slight injury at 0.4 lb ai per acre |
| 25388 | Holly | <i>Ilex sp.</i> | I. x meserveae 'Blue Prince' | Field Container | Mathers | 2006 | Over the top | No injury at any rate (0.5, 1.0, 2.0 lb ai per acre). |
| 25388 | Holly | <i>Ilex sp.</i> | I. x meserveae 'Blue Princess' | Field Container | Altland | 2006 | Over the top | No injury at any rate (0.5, 1 and 2 lb ai/A) |
| 25428 | Holly, Dwarf Yaupon | <i>Ilex vomitoria 'nana'</i> | | Field Container | Gilliam | 2006 | Over the top | No injury or growth reduction at 0.5, 1.0, and 2.0 lb ai per acre. |
| 25428 | Holly, Dwarf Yaupon | <i>Ilex vomitoria 'nana'</i> | | Field Container | Neal | 2006 | Over the top | No significant injury at 0.5, 1.0, and 2.0 lb ai per acre. |
| 26581 | Anise Tree | <i>Illicium sp.</i> | I. parviflorum | Field In-Ground | Czarnota | 2006 | Over the top | No injury at 0.4 lb ai per acre |
| 25389 | Juniper | <i>Juniperus sp.</i> | J. conferta 'Blue Pacific' | Field Container | Gilliam | 2006 | Over the top | Slight to moderate injury increasing with rate (0.5, 1.0, 2.0 lb ai per acre) with a significant reduction in plant size. |
| 25389 | Juniper | <i>Juniperus sp.</i> | J. horizontalis 'Wiltonii' | Field Container | Fraelich | 2006 | Over the top | No injury; slight stunting at 0.5 lb ai per acre, moderate at 2X and 4X rates |
| 25389 | Juniper | <i>Juniperus sp.</i> | J. sabina 'Calgary Carpet' | Field Container | Altland | 2006 | Over the top | Significant injury at all rates (0.5, 1 and 2 lb ai/A) |
| 25389 | Juniper | <i>Juniperus sp.</i> | J. squamata 'Blue Carpet' | Field Container | Mathers | 2006 | Over the top | Slight to moderate injury, abating somewhat over time (0.5, 1.0, 2.0 lb ai per acre). |
| 26564 | Crape Myrtle | <i>Lagerstroemia indica</i> | | Field In-Ground | Czarnota | 2006 | Over the top | No injury at 0.4 lb ai per acre |
| 26622 | Crape Myrtle | <i>Lagerstroemia indica</i> | L. x Tuscarora | Field Container | Neal | 2006 | Over the top | Slight transient injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25420 | Shrub Verbena | <i>Lantana sp.</i> | | Field Container | Derr | 2006 | Over the top | Slight injury at all rates |
| 25421 | Lilyturf, Creeping | <i>Liriope sp.</i> | L. muscari variegata | Field Container | Neal | 2006 | Over the top | Significant injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25421 | Lilyturf, Creeping | <i>Liriope sp.</i> | L. muscari variegata 'Aztec' | Field Container | Derr | 2006 | Over the top | Slight injury but shoot weight decreased significantly as rate increased |
| 26565 | Magnolia, Southern | <i>Magnolia grandiflora</i> | | Field In-Ground | Czarnota | 2006 | Over the top | No injury at 0.4 lb ai per acre |

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|---------------------------------|------------------------------|------------------------|-----------------|----------------|------|------------------|--|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25414 | Magnolia, Southern | <i>Magnolia grandiflora</i> | 'Cherry' | Field Container | Fraelich | 2006 | Over the top | Severe injury (leaf burn) and growth reduction at all rates |
| 25422 | Mondo Grass, Lilyturf, Ker-Gawl | <i>Ophiopogon sp.</i> | O. japonicus variegata | Field Container | Derr | 2006 | Over the top | No injury at all rates |
| 25423 | Pentas | <i>Pentas sp.</i> | 'Ruby Red' | Field Container | Derr | 2006 | Over the top | Slight injury at all rates |
| 25405 | Spruce, Norway | <i>Picea abies</i> | | Field Container | Altland | 2006 | Over the top | Slight transient injury only at 4x rate (2 lb ai/A) after the first application, but no significant injury after the second |
| 25405 | Spruce, Norway | <i>Picea abies</i> | | Field Container | Freiberger | 2006 | Over the top | Slight injury at all rates (0.5, 1 and 2 lb ai per acre); no growth reduction |
| 25984 | Pine, White | <i>Pinus strobus</i> | | Field Container | Beste/Frank | 2006 | Over the top | No significant injury or growth reduction at all rates (0.5, 1 and 2 lb ai per acre); plants marketable |
| 25981 | Pine, Loblolly | <i>Pinus taeda</i> | | Field Container | Beste/Frank | 2006 | Over the top | No significant injury or growth reduction at all rates (0.5, 1 and 2 lb ai per acre); plants marketable |
| 25406 | Cherry (Non-Bearing) | <i>Prunus sp.</i> | P. avium | Field Container | Altland | 2006 | Over the top | Significant injury with single application at all rates (0.5, 1 and 2 lb ai/A) |
| 25927 | Cherry (Non-Bearing) | <i>Prunus sp.</i> | P. serotina | Field In-Ground | Beste/Frank | 2006 | Over the top | Unacceptable injury and growth reduction at all rates (0.5, 1 and 2 lb ai per acre) |
| 25385 | Fir, Douglas | <i>Pseudotsuga menziesii</i> | | Field Container | Altland | 2006 | Over the top | Significant injury at all rates (0.5, 1 and 2 lb ai/A) |
| 25385 | Fir, Douglas | <i>Pseudotsuga menziesii</i> | | Field Container | Boydston | 2006 | Over the top | Significant stunting at 4X, plants treated with lower rates marketable |
| 25385 | Fir, Douglas | <i>Pseudotsuga menziesii</i> | | Field Container | Freiberger | 2006 | Over the top | Slight injury after 1st, high after 2nd application at all rates (0.5, 1 and 2 lb ai per acre); some growth reduction |
| 25940 | 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 (0.5, 1 and 2 lb ai per acre) |
| 25940 | Fir, Douglas | <i>Pseudotsuga menziesii</i> | | Field In-Ground | Beste/Frank | 2006 | Over the top | Significant injury with complete recovery at the 4x rate (2 lb ai per acre); growth reduction at 2X and 4X rates; no reduction in market value |
| 26081 | Oak, Pin | <i>Quercus palustris</i> | | Field In-Ground | Beste/Frank | 2006 | Over the top | Significant injury and growth reduction at all rates (0.5, 1 and 2 lb ai per acre); plants marketable |
| 25462 | Oak, Northern Red | <i>Quercus rubra</i> | | Field Container | Altland | 2006 | Over the top | Virtually no injury at any rate (0.5, 1 and 2 lb ai/A) |
| 25462 | Oak, Northern Red | <i>Quercus rubra</i> | | Field Container | Fraelich | 2006 | Over the top | Very slight, transient injury at 4X rate, no growth reduction |

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|------------------------|-----------------------------------|---------------------------------|-----------------|----------------|------|-------------------------|---|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25462 | Oak, Northern Red | <i>Quercus rubra</i> | | Field Container | Freiberger | 2006 | Over the top | Slight injury after 1st, moderate after 2nd application at all rates (0.5, 1 and 2 lb ai per acre); some growth reduction |
| 25920 | Oak, Northern Red | <i>Quercus rubra</i> | | Field In-Ground | Beste/Frank | 2006 | Ground Broadcast Foliar | No significant injury but plant size reduced at 0.5, 1 and 2 lb ai per acre; no reduction in crop marketability |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | 'Congo' | Field Container | Gilliam | 2006 | Over the top | No injury after the first application, but slight injury increasing with rate (0.5, 1.0, 2.0 lb ai per acre) after the second and there was a reduction in plant size. |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | 'Crete' | Field Container | Senesac | 2006 | Over the top | Moderate injury at all rates |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | 'Fashion' | Field Container | Fraelich | 2006 | Over the top | Very slight, slight and moderate injury at 0.5 lb ai per acre, 1 and 2 lb ai per acre; no growth reduction |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | 'Girard Rose' | Field Container | Beste/Frank | 2006 | Over the top | No injury or growth reduction at all rates (0.5, 1 and 2 lb ai/A); plants marketable |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | 'Nuccio's Wild Cherry' | Field Container | Wilen | 2006 | Over the top | Acceptable injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | 'Pink Gumpo' | Field Container | Neal | 2006 | Over the top | No significant injury at 0.5, 1.0, and 2.0 lb ai per acre. |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | R. catawbiense 'English Roseum' | Field Container | Beste/Frank | 2006 | Over the top | Moderate to significant injury increasing with rate after both applications (0.5, 1.0, 2.0 lb ai per acre), but this chlorosis and slight leaf distortion was transient so that by the end of the experiment all plants except the 4X rate were marketable. |
| 25383 | Azalea, & Rhododendron | <i>Rhododendron sp.</i> | R. 'P.J.M.' | Field Container | Ahrens/Mervosh | 2006 | Over the top | Acceptable injury at 0.5 lb ai per acre, unacceptable at 1 and 2 lb ai |
| 25391 | Rose | <i>Rosa sp.</i> | 'Beloved' | Field Container | Gilliam | 2006 | Over the top | No injury or growth reduction at 0.5, 1.0, and 2.0 lb ai per acre. |
| 25391 | Rose | <i>Rosa sp.</i> | 'Moonshadow' | Field Container | Gilliam | 2006 | Over the top | No injury or growth reduction at 0.5, 1.0, and 2.0 lb ai per acre. |
| 25391 | Rose | <i>Rosa sp.</i> | 'Orange & Lemons' | Field Container | Mathers | 2006 | Over the top | Moderate to significant injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25391 | Rose | <i>Rosa sp.</i> | R. hybrida 'Red Sunblaze' | Field Container | Boydston | 2006 | Over the top | No injury at 0.5 lb ai per acre, significant injury and growth reduction at higher rates |
| 25391 | Rose | <i>Rosa sp.</i> | R. multiflora | Field Container | Freiberger | 2006 | Over the top | Moderate injury at 0.5 lb ai per acre, high at higher rates; some growth reduction |
| 25391 | Rose | <i>Rosa sp.</i> | 'Sea Foam' | Field Container | Senesac | 2006 | Over the top | High injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25391 | Rose | <i>Rosa sp.</i> | 'Solstice' | Field Container | Gilliam | 2006 | Over the top | No injury or growth reduction at 0.5, 1.0, and 2.0 lb ai per acre. |
| 25407 | Coneflower, Orange | <i>Rudbeckia fulgida speciosa</i> | 'Becky' | Field Container | Derr | 2006 | Over the top | Significant injury at all rates (0.5, 1 and 2 lb ai/A). |

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|---------------------------|------------------------------------|---------------------------------|-----------------|----------------|------|------------------|--|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25407 | Coneflower, Orange | <i>Rudbeckia fulgida speciosa</i> | R. 'Goldsturm' | Field Container | Boydston | 2006 | Over the top | Significant injury at all rates (0.5, 1.0, 2.0 lb ai per acre) such that more than 50% were not saleable at the end of the experiment. |
| 25407 | Coneflower, Orange | <i>Rudbeckia fulgida speciosa</i> | 'Viettas Little Suzie' | Field Container | Mathers | 2006 | Over the top | Moderate to significant injury including mortality with increasing rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25408 | Sage, Ramona | <i>Salvia sylvestris</i> | S. elegans 'Tangerine' | Field Container | Derr | 2006 | Over the top | Severe injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25408 | Sage, Ramona | <i>Salvia sylvestris</i> | S. nemorosa 'May Night' | Field Container | Lieth | 2006 | Over the top | High injury and growth reduction at all rates; plants unmarketable (0.5, 1 and 2 lb ai/A). |
| 25408 | Sage, Ramona | <i>Salvia sylvestris</i> | S. nemorosa 'Snow Hill' | Field Container | Boydston | 2006 | Over the top | Severe injury and growth reduction at all rates (0.5, 1 and 2 lb ai/A). |
| 25392 | Bridal-Wreath | <i>Spiraea sp.</i> | 'Gooldflame' | Field Container | Ahrens/Mervosh | 2006 | Over the top | Severe injury at all rates (0.5, 1 and 2 lb ai per acre) |
| 25392 | Bridal-Wreath | <i>Spiraea sp.</i> | S. bumalda 'Anthony Waterer' | Field Container | Beste/Frank | 2006 | Over the top | Significant reduction of plant size, flower number and marketability at all rates (0.5, 1 and 2 lb ai/A) |
| 25392 | Bridal-Wreath | <i>Spiraea sp.</i> | S. decumbens | Field Container | Senesac | 2006 | Over the top | Moderate, transient injury with complete recovery at lower rates (0.5, 1 and 2 lb ai/A). |
| 25392 | Bridal-Wreath | <i>Spiraea sp.</i> | S. japonica 'Little Princess' | Field Container | Neal | 2006 | Over the top | Significant injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25392 | Bridal-Wreath | <i>Spiraea sp.</i> | S. x bumalda 'Gold Mound' | Field Container | Derr | 2006 | Over the top | Severe injury at all rates (0.5, 1 and 2 lb ai/A). |
| 25392 | Bridal-Wreath | <i>Spiraea sp.</i> | S. x bumalda 'Goldmound' | Field Container | Mathers | 2006 | Over the top | Slight to significant injury increasing with time and second application (0.5, 1.0, 2.0 lb ai per acre). |
| 24938 | Bald Cypress | <i>Taxodium distichum</i> | | Field In-Ground | Czarnota | 2006 | Over the top | No injury at 0.4 lb ai per acre |
| 25393 | Yew | <i>Taxus sp.</i> | T. cuspidata | Field Container | Fraelich | 2006 | Over the top | No injury or growth reduction at all rates (0.5, 1 and 2 lb ai/A). |
| 25396 | Arborvitae | <i>Thuja sp.</i> | 'Emerald Green' | Field Container | Ahrens/Mervosh | 2006 | Over the top | Moderate to high injury with increasing rates (0.5, 1 and 2 lb ai per acre) |
| 26569 | Arborvitae | <i>Thuja sp.</i> | T. occidentalis | Field In-Ground | Czarnota | 2006 | Over the top | No injury at 0.4 lb ai per acre |
| 25396 | Arborvitae | <i>Thuja sp.</i> | T. occidentalis 'Emerald Green' | Field Container | Lieth | 2006 | Over the top | High injury and growth reduction at all rates; plants unmarketable (0.5, 1 and 2 lb ai/A). |
| 25668 | Jasmine, Asian | <i>Trachelospermum asiaticum</i> | | Field Container | Gilliam | 2006 | Over the top | No injury or growth reduction at 0.5, 1.0, and 2.0 lb ai per acre. |
| 25668 | Jasmine, Asian | <i>Trachelospermum asiaticum</i> | 'Green' | Field Container | Fraelich | 2006 | Over the top | No injury or growth reduction at all rates (0.5, 1 and 2 lb ai/A). |
| 26464 | Jasmine, Star;Confederate | <i>Trachelospermum jasminoides</i> | | Field Container | Wilen | 2006 | Over the top | Acceptable injury at all rates (0.5, 1 and 2 lb ai/A). |
| 26575 | Palm, Windmill | <i>Trachycarpus fortunei</i> | | Field In-Ground | Czarnota | 2006 | Over the top | No injury at 0.4 lb ai per acre |

| PR # | Crop | | | Production Site | Researcher(s) | Year | Application Type | Results Summary |
|-------|---------------------|--------------------------|---------------------|-----------------|---------------|------|------------------|---|
| | Common Name | Latin Name | Cultivar | | | | | |
| 25394 | Viburnum, arrowwood | <i>Viburnum dentatum</i> | | Field Container | Mathers | 2006 | Over the top | Moderate persistent injury at all rates (0.5, 1.0, 2.0 lb ai per acre). |
| 25394 | Viburnum, arrowwood | <i>Viburnum dentatum</i> | | Field Container | Freiberger | 2006 | Over the top | High injury and growth reduction at all rates (0.5, 1 and 2 lb ai per acre) |
| 25394 | Viburnum, arrowwood | <i>Viburnum dentatum</i> | 'Autumn Jazz' | Field Container | Altland | 2006 | Over the top | Significant injury with single application at all rates (0.5, 1 and 2 lb ai/A) |
| 25394 | Viburnum, arrowwood | <i>Viburnum dentatum</i> | V. 'Chicago Lustre' | Field Container | Beste/Frank | 2006 | Over the top | Significant, but transient injury at all rates (0.5, 1.0, 2.0 lb ai per acre) with significant size reduction at the 4X rate. |
| 26503 | Arrowwood | <i>Viburnum sp.</i> | V. carlesii | Field Container | Altland | 2006 | Over the top | Significant injury with single application at all rates (0.5, 1 and 2 lb ai/A) |
| 26503 | Arrowwood | <i>Viburnum sp.</i> | V. tinus compacta | Field Container | Neal | 2006 | Over the top | Moderate to significant injury increasing with rate (0.125, 0.25, 0.5 lb ai per acre). |
| 25409 | Periwinkle | <i>Vinca sp.</i> | V. minor 'Bowles' | Field Container | Lieth | 2006 | Over the top | No injury or growth reduction at all rates (0.5, 1 and 2 lb ai/A) |
| 25409 | Periwinkle | <i>Vinca sp.</i> | V. minor 'Myrtle' | Field Container | Boydston | 2006 | Over the top | No injury at all rates (0.5, 1 and 2 lb ai/A). |

Label Suggestions

For V-10142 75WDG, 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.

Appendix 1: Available Protocol

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 Kwheeler@gowanco.com |
| | 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, bobby_walls@fmc.com |
| | 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, jcham@valent.com |
| | 1.0 lb ai/acre | | |
| | 2.0 lb ai/acre | | |
| Untreated | -- | -- | |
| Comparison Treatment | | | |
| 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, bobby_walls@fmc.com |
| | 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 OR Ely Vea, 308 Aston Forest Lane, Crownsville, MD 21032, Phone & FAX#: 410-923-4880, E-mail: evvea@comcast.net.

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

Appendix 2: Contributing Researchers

| | |
|-------------------|--|
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Appendix 3: Submitted Data

Data on following pages are in order of PR number with the exception of the reports from Drs. Altland, Czarnota, Derr, Gilliam, Klett, Mathers, Neal, Senesac, Wilen, and Mr. Freiburger. These reports cover multiple PR numbers and are at the beginning of this Appendix.