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IR-4 Ornamental Horticulture Program EXC3898 Crop Safety

**Authors: Cristi L. Palmer and Ely Vea
Date: May 1, 2009**

Acknowledgements

**Lori Harrison
Karen Sims**

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Abstract

During 2008, IR-4 completed 97 trials on EXC3898 (mesotrione + prodiamine + s-metolachlor). The data contained in this report was generated to register uses of EXC3898 on and around ornamental horticulture plants with over-the-top applications. The mesotrione rates were 2.1, 4.2 and 6.3 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 3X rates. EXC3898 had been applied to 39 plant genera or species. Of these, five exhibited no or minimal transient injury after application at all three rates. Twenty crops exhibited significant phytotoxicity at even the lowest rate: *Buddleia davidii*, *Dianthus gratianopolitanus*, *Echinacea purpurea*, *Hydrangea quercifolia*, *Ilex* sp., *Lagerstroemia indica*, *Liriope* sp., *Ophiopogon* sp., *Phlox paniculata*, *Phlox subulata*, *Picea* sp., *Pseudotsuga menziesii*, *Rosa* sp., *Salvia sylvestris*, *Spiraea* sp., *Taxus* sp., *Thuja occidentalis*, *Veronica* sp., *Viburnum* sp., and *Vinca* sp.

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. In 2008, IR-4 started testing the crop safety of EXC3898, a combination product of mesotrione, prodiamine and s-metolachlor.

Materials and Methods

Two applications of EXC3898 were made approximately 6 weeks apart. The application rates were 2.1, 4.2 and 6.3 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.

EXC3898 was supplied to researchers (See list of researchers in Appendix 2) by Syngenta Corporation.

Results and Summary

Phytotoxicity

Based on the type and nature of injury seen with EXC3898 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 3X 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.

EXC3898 exhibited no or minimal negative impact on two plant genera or species with over the top applications (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. Two crops exhibited this type of response (Table 2). Eighteen tested crops exhibited damage sufficient to recommend growers not utilize EXC3898 as an over-the-top treatment for pre-emergent weed control (Table 3): *Berberis thunbergii*, *Buddleia davidii*, *Clematis* sp., *Cotoneaster apiculatus*, *Cotoneaster glaucophyllus*, *Hydrangea* sp., *Ilex crenata*, *Lagerstroemia indica*, *Lavandula x intermedia*, *Ligustrum lucidum*, *Nepeta cataria*, *Nepeta x faasseni*, *Potentilla fruticosa*, *Quercus alba*, *Rosa* sp. ², *Salvia* sp., *Spirea* sp., and *Syringa* sp. For 27 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).

See Table 5 for a list of completed trials.

Table 1. List of EXC3898 treated crops with no or minimal transitory injury.

Acer rubrum

Viburnum sp.

Table 2. List of EXC3898 treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity

Juniperus conferta

*Rhododendron sp.*¹

Table 3. List of EXC3898 treated crops exhibiting significant injury.

Berberis thunbergii

Ligustrum lucidum

Buddleia davidii

Nepeta cataria

Clematis sp.

Nepeta x faasseni

Cotoneaster apiculatus

Potentilla fruticosa

Cotoneaster glaucophyllus

Quercus alba

Hydrangea sp.

*Rosa sp.*²

Ilex crenata

Salvia sp.

Lagerstroemia indica

Spirea sp.

Lavandula x intermedia

Syringa sp.

Table 4. List of EXC3898 treated crops where more information is needed.

Abelia sp.

Juniperus communis

Abies sp.

Magnolia stellata

*Acer palmatum*²

Nandina domestica

Acer saccharum

Picea omorika

Agapanthus africanus

Pieris japonica

Buxus sp.

Pinus mugo

Camellia japonica

Pinus taeda

Camellia sasanqua

Quercus rubra

Euonymus alataus

*Raphiolepis indica*²

Euonymus fortune

Sedum x spectabile

Forsythia sp.

Taxus baccata

Ilex glabra

*Taxus x media*²

Juniperus andorra

Thuja occidentalis

Juniperus chinensis

¹ Differential response possibly due to different cultivars.

² In two trials, no injury after 2 applications at all rates.

Table 5. Detailed Summary of Crop Safety Testing with EXC3898

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						
27077	Abelia	Abelia sp.		Field Container	Lieth	2008	Over the top	Unacceptable injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20090420e.pdf
27077	Abelia	Abelia sp.	A. zanderi 'Little Richard'	Field Container	Senesac	2008	Over the top	No injury or growth reduction at 2.13, 4.26 and 6.39 lb ai per acre	20081219d.pdf
27080	Fir	Abies sp.	A. balsamea	Field Container	Freiberger	2008	Directly on soil surface	Virtually no injury at 2.1, 4.2 and 6.3 lb ai per acre	20090319c.pdf
27080	Fir	Abies sp.	A. fraseri	Field Container	Boydston	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre; width reduction at 2X and 3X but all plants marketable	20090129c.pdf
27085	Maple, Japanese	Acer palmatum		Field Container	Reding	2008	Over the top	No injury and no significant difference in growth or marketability at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf
27085	Maple, Japanese	Acer palmatum	'Atropurpureum'	Field Container	Beste/Frank	2008	Over the top	No significant injury at 2.1, significant at 4.2 and 6.3 lb ai per acre; no growth reduction but reduced plant marketability for all treatments because of environmental stress	20081217c.pdf
27089	Maple, Red	Acer rubrum		Field Container	Reding	2008	Over the top	No injury and no significant difference in growth or marketability at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27089	Maple, Red	Acer rubrum		Field Container	Senesac	2008	Over the top	No injury or growth reduction at 2.13, 4.26 and 6.39 lb ai per acre	20081219d.pdf
27089	Maple, Red	Acer rubrum	'Summer'	Field Container	Gilliam	2008	Over the top	No injury after first application of 2.1, 4.2, and 6.3 lb ai per acre, but no to moderate injury increasing with rate and appearing 4 weeks after second application; however, there was no significant reduction in plant growth.	20081224a.pdf
27089	Maple, Red	Acer rubrum	'Sun Valley'	Field Container	Mathers	2008	Over the top	No significant injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20081030q.pdf
27094	Maple	Acer sp.	A. saccharum	Field Container	Senesac	2008	Over the top	No injury or growth reduction at 2.13, 4.26 and 6.39 lb ai per acre	20081219d.pdf
28470	Lily-Of-The-Nile	Agapanthus sp.	A. africanus 'Peter Pan'	Field Container	Uber	2008	Over the top	No significant injury at 2.1, 4.2 and 6.3 lb ai per acre; significant growth reduction at 4X	20090420h.pdf
27101	Barberry	Berberis sp.	B. thunbergii 'Amber Glow'	Field Container	Uber	2008	Over the top	High injury at 2.1, 4.2 and 6.3 lb ai per acre	20090420h.pdf
27101	Barberry	Berberis sp.	B. thunbergii atropurpureum 'Crimson Pygmy'	Field Container	Beste/Frank	2008	Over the top	No significant injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20081224d.pdf
27101	Barberry	Berberis sp.	B. thunbergii 'Crimson Pigmy'	Field Container	Lieth	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre after 1st, unacceptable after 2nd application; no significant growth reduction	20090420e.pdf
27101	Barberry	Berberis sp.	B. thunbergii 'Crimson Pygmy'	Field Container	Williams	2008	Over the top	No injury or growth reduction at 100, 200 and 300 lb per acre	20081030h.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27104	Butterfly Bush	Buddleia davidii		Field Container	Derr	2008	Over the top	Severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20090420g.pdf
27104	Butterfly Bush	Buddleia davidii	'Nanho Blue'	Field Container	Mathers	2008	Over the top	Severe injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20081030r.pdf
27104	Butterfly Bush	Buddleia davidii	'Petite Purple'	Field Container	Boydston	2008	Over the top	Severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20090326b.pdf
27104	Butterfly Bush	Buddleia davidii	'Pink Delight'	Field Container	Beste/Frank	2008	Over the top	Severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20090130e.pdf
27107	Boxwood	Buxus sp.	B. 'Green Mountain'	Field Container	Senesac	2008	Over the top	No injury at 2.13, very slight at 4.26 and 6.39 lb ai per acre; no growth reduction	20081219d.pdf
27107	Boxwood	Buxus sp.	B. 'Wintergem'	Field Container	Trader	2008	Over the top	No significant injury at 2.1, 4.2 and 6.3 lb ai per acre	20080924f.pdf
27112	Camellia	Camellia sp.	C. japonica	Field Container	Wade	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20080915a.pdf
27112	Camellia	Camellia sp.	C. sasanqua 'Pink Charm'	Field Container	Trader	2008	Over the top	No significant injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20080924f.pdf
27118	Clematis	Clematis sp.		Field Container	Derr	2008	Over the top	Unacceptable injury at 2.1, 4.2 and 6.3 lb ai per acre	20090420g.pdf
27118	Clematis	Clematis sp.	C. integrifolia	Field Container	Klett	2008	Over the top	Trial 1: Severe injury at 2.1, 4.2 and 6.3 lb ai per acre; growth reduction	20090319i.pdf
27118	Clematis	Clematis sp.	C. integrifolia	Field Container	Klett	2008	Over the top	Trial 2: Severe injury at 2.1, 4.2 and 6.3 lb ai per acre; growth reduction	20090319i.pdf
27133	Cotoneaster	Cotoneaster sp.	C. apiculatus	Field Container	Reding	2008	Over the top	Slight injury at 2.1, moderate and high at 4.2 and 6.3 lb ai per acre; growth reduction at 2X and 3X	20081223a.pdf
27133	Cotoneaster	Cotoneaster sp.	C. glaucophyllus	Field Container	Uber	2008	Over the top	Moderate injury at 2.1, high at 4.2 and 6.3 lb ai per acre	20090420h.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27133	Cotoneaster	Cotoneaster sp.	C. horizontalis 'Perpusillus'	Field Container	Lieth	2008	Over the top	Phytotoxicity data inconclusive due to heat stress; some growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20090420e.pdf
27148	Winged Burning Bush	Euonymus alatus	'Compacta'	Field Container	Reding	2008	Over the top	No injury and no significant difference in growth or marketability at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf
27148	Winged Burning Bush	Euonymus alatus	E. alatus 'Compactus'	Field Container	Boydston	2008	Over the top	No injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20090129c.pdf
27148	Winged Burning Bush	Euonymus alatus	E. fortunei 'Coloratus'	Field Container	Williams	2008	Over the top	Slight injury (chlorosis) at 100, moderate at 200 and 300 lb per acre; slight plant width reduction	20081030h.pdf
27087	Golden Bells	Forsythia sp.	F. x intermedia 'Golden Bell'	Field Container	Mickelbart	2008	Over the top	Slight to minor chlorosis increasing with rate (2.1, 4.2, and 6.3 lb ai per acre).	20081029a.pdf
27158	Hydrangea	Hydrangea sp.		Field Container	Derr	2008	Over the top	Unacceptable injury at 2.1, 4.2 and 6.3 lb ai per acre	20090420g.pdf
27158	Hydrangea	Hydrangea sp.	H. macrophylla 'Nikko Blue'	Field Container	Fraelich	2008	Over the top	Slight injury (chlorosis) at 2.1 lb ai per acre, moderate at 4.2 and 6.3 lb per acre; only 2 of 9 plants marketable at 1X	20081030d.pdf
27158	Hydrangea	Hydrangea sp.	H. macrophylla 'Nikko Blue'	Field Container	Reding	2008	Over the top	Moderate to high injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf
27158	Hydrangea	Hydrangea sp.	H. paniculata 'PeeGee'	Field Container	Mickelbart	2008	Over the top	Slight chlorosis at 2.1, 4.2 and 6.3 lb ai per acre.	20081029a.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
28162	Inkberry	Ilex glabra	'Densa'	Field Container	Senesac	2008	Over the top	No injury or growth reduction at 2.13, 4.26 and 6.39 lb ai per acre	20081219d.pdf
27161	Holly	Ilex sp.	I. crenata 'Convexa'	Field Container	Mathers	2008	Over the top	Significant injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20081030m.pdf
27164	Juniper	Juniperus sp.	J. andorra	Field Container	Harvey	2008	Over the top	No injury at 2.1 and 4.2, slight at 6.3 lb ai per acre.	20080924e.pdf
27164	Juniper	Juniperus sp.	J. chinensis 'Sea Green'	Field Container	Mickelbart	2008	Over the top	No injury at 2.1, 4.2, and 6.3 lb ai per acre with application 6 weeks after transplanting.	20081029a.pdf
27164	Juniper	Juniperus sp.	J. communis 'Gold Totem Pole'	Field Container	Senesac	2008	Over the top	No significant injury or growth reduction at 2.13, 4.26 and 6.39 lb ai per acre.	20081219d.pdf
27164	Juniper	Juniperus sp.	J. conferta	Field Container	Trader	2008	Over the top	No significant injury at 2.1 and 4.2, significant injury with complete recovery at 6.3 lb ai per acre; no growth reduction.	20080924f.pdf
27167	Crape Myrtle	Lagerstroemia indica		Field Container	Derr	2008	Over the top	Unacceptable injury at 2.1, 4.2 and 6.3 lb ai per acre	20090420g.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27167	Crape Myrtle	Lagerstroemia indica	'Acoma'	Field Container	Gilliam	2008	Over the top	Minor to significant injury after first application of 2.1, 4.2, and 6.3 lb ai per acre with some abatement after the second application of 2.1 lb ai per acre, but with the higher rates leaf discoloration and drop increased after the second application and plants died; plant growth decreased as the rate increased.	20081224a.pdf
27167	Crape Myrtle	Lagerstroemia indica	'Natchez'	Field Container	Wade	2008	Over the top	Significant injury at 2.1, 4.2 and 6.3 lb ai per acre	20080915a.pdf
27172	Lavender	Lavandula sp.	L. x intermedia 'Grosso'	Field Container	Boydston	2008	Over the top	Severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20090326b.pdf
28473	Privet	Ligustrum sp.	L. lucidum	Field Container	Uber	2008	Over the top	Slight, moderate and high injury at 2.1, 4.2 and 6.3 lb ai per acre; significant growth reduction at 2X and 4X	20090420h.pdf
27183	Magnolia	Magnolia sp.	M. stellata 'Royal Star'	Field Container	Beste/Frank	2008	Over the top	No significant injury at 2.1 and 4.2, significant at 6.3 lb ai per acre; no growth reduction; all plants marketable	20090130e.pdf
27191	Heavenly Bamboo	Nandina domestica	'Firepower'	Field Container	Gilliam	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre after the first application, and only very slight injury at the highest rate after the second application.	20081224a.pdf
27196	Catnip	Nepeta cataria	'Psfike'	Field Container	Klett	2008	Over the top	Trial 1: Moderate to severe injury at 2.1, 4.2 and 6.3 lb ai per acre; growth reduction	20090319i.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27196	Catnip	Nepeta cataria	'Psfike'	Field Container	Klett	2008	Over the top	Trial 2: Slight, moderate and severe injury at 2.1, 4.2 and 6.3 lb ai per acre; growth reduction at 2X and 4X	20090319i.pdf
27201	Catmint	Nepeta x faasseni		Field Container	Lieth	2008	Over the top	Unacceptable injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20090420e.pdf
28477	Photinia	Photinia sp.	P. fraseri	Field Container	Uber	2008	Over the top	No significant injury or growth reduction at 2.1, high injury and stunting at 4.2 and 6.3 lb ai per acre	20090420h.pdf
27207	Spruce	Picea sp.	P. omorika	Field Container	Harvey	2008	Over the top	No injury at 2.1 and 4.2, slight at 6.3 lb ai per acre	20080924e.pdf
27212	Andromeda	Pieris sp.	P. japonica 'Compacta'	Field Container	Beste/Frank	2008	Over the top	No significant injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20090316j.pdf
27217	Pine	Pinus sp.	P. mugo	Field Container	Harvey	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre	20080924e.pdf
27217	Pine	Pinus sp.	P. taeda	Field Container	Wade	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20080915a.pdf
27222	Cinquefoil	Potentilla sp.	P. fruticosa 'Goldfinger'	Field Container	Uber	2008	Over the top	High injury at 2.1, 4.2 and 6.3 lb ai per acre	20090420h.pdf
27222	Cinquefoil	Potentilla sp.	P. fruticosa 'Monsidh'	Field Container	Klett	2008	Over the top	Trial 1: Severe injury at 2.1, 4.2 and 6.3 lb ai per acre; growth reduction	20090319i.pdf
27222	Cinquefoil	Potentilla sp.	P. fruticosa 'Monsidh'	Field Container	Klett	2008	Over the top	Trial 2: Severe injury at 2.1, 4.2 and 6.3 lb ai per acre; growth reduction	20090319i.pdf
27228	Oak	Quercus sp.	Q. alba	Field Container	Freiberger	2008	Directly on soil surface	Severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20090319c.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27228	Oak	Quercus sp.	Q. rubra	Field Container	Mathers	2008		No significant injury at 2.1, 4.2 and 6.3 lb ai per acre; slight stunting; researcher suggested "more trials warranted"	20081030p.pdf
27233	Indian Hawthorn	Raphiolepis indica		Field Container	Gilliam	2008	Over the top	No injury at 2.1, 4.2, and 6.3 lb ai per acre with two applications.	20081224a.pdf
27233	Indian Hawthorn	Raphiolepis indica	'Indian Princess'	Field Container	Lieth	2008	Over the top	Very slight injury but unacceptable growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20090420e.pdf
27236	Azalea, & Rhododendron	Rhododendron sp.	'Fanstastica'	Field Container	Senesac	2008	Over the top	Slight injury at 2.13, moderate at 4.26 and 6.39 lb ai per acre	20081219d.pdf
27236	Azalea, & Rhododendron	Rhododendron sp.	'Gwenda'	Field Container	Wade	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20080915a.pdf
27236	Azalea, & Rhododendron	Rhododendron sp.	'Lee's Dark Purple'	Field Container	Reding	2008	Over the top	No injury and no significant difference in growth or marketability at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf
27236	Azalea, & Rhododendron	Rhododendron sp.	'Midnight Flare'	Field Container	Trader	2008	Over the top	No significant injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20080924f.pdf
27465	Azalea	Rhododendron sp.	'Vulcan'	Field Container	Regan	2007	Over the top	No significant injury and growth reduction at 0.187 and 0.25, high at 0.37 lb ai per acre	20080108d.pdf
27465	Azalea	Rhododendron sp.	'White'	Field Container	Freiberger	2008	Over the top	Moderate to severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20090319c.pdf
27239	Rose	Rosa sp.		Field Container	Derr	2008	Over the top	Slight injury at 2.1, 4.2 and 6.3 lb ai per acre; considered unacceptable	20090420g.pdf
27239	Rose	Rosa sp.	'Nearly Wild'	Field Container	Wade	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20080915a.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27239	Rose	Rosa sp.	R. woodsii	Field Container	Harvey	2008	Over the top	Severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20080924e.pdf
27242	Sage, Ramona	Salvia sylvestris	Salvia sp. 'May Night'	Field Container	Williams	2008	Over the top	Unacceptable injury and growth reduction at 100, 200 and 400 lb per acre	20090218b.pdf
28158	Stonecrop	Sedum sp.	S. x spectabile 'Autumn Joy'	Field Container	Williams	2008	Over the top	No injury at 2.1, 4.2 and 8.4 lb ai per acre; slight height reduction at 2X and 4X	20090218b.pdf
27246	Bridal-Wreath	Spiraea sp.	'Dolchica'	Field Container	Trader	2008	Over the top	Unacceptable injury at 2.1, 4.2 and 6.3 lb ai per acre	20080924f.pdf
27246	Bridal-Wreath	Spiraea sp.	'Reeves'	Field Container	Gilliam	2008	Over the top	Very slight transitory injury at 2.1 lb ai per acre, but slight to moderate injury at 4.2 and 6.3 lb ai per acre.	20081224a.pdf
27246	Bridal-Wreath	Spiraea sp.	S. japonica 'Goldflame'	Field Container	Reding	2008	Over the top	Moderate to high injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf
27246	Bridal-Wreath	Spiraea sp.	S. thunbergii	Field Container	Mickelbart	2008	Over the top	No injury at 2.1, 4.2, and 6.3 lb ai per acre with single application 6 weeks after transplanting.	20081029a.pdf
27251	Lilac	Syringa sp.	'Miss Kim'	Field Container	Harvey	2008	Over the top	Moderate injury at 2.1, high at 4.2 and 6.3 lb ai per acre	20080924e.pdf
27251	Lilac	Syringa sp.	S x tribida 'Lark Song'	Field Container	Mathers	2008	Over the top	Severe injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20081030o.pdf
27251	Lilac	Syringa sp.	S. microphylla 'Superba'	Field Container	Beste/Frank	2008	Over the top	Severe injury at 2.1, 4.2 and 6.3 lb ai per acre	20090316j.pdf
27251	Lilac	Syringa sp.	S. patula 'Miss Kim'	Field Container	Williams	2008	Over the top	Virtually no injury, no growth reduction at 100, 200 and 400 lb per acre	20090218b.pdf
27251	Lilac	Syringa sp.	S. patula x macrophylla 'Josee'	Field Container	Reding	2008	Over the top	Severe injury and growth reduction at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf

PR #	Crop			Production Site	Researcher(s)	Year	Application Method	Results Summary	File Name
	Common Name	Latin Name	Cultivar						
27254	Yew	Taxus sp.	T. baccata	Field Container	Senesac	2008	Over the top	No significant injury or growth reduction at 2.13, 4.26 and 6.39 lb ai per acre	20081219d.pdf
27254	Yew	Taxus sp.	T. x media 'Densiformis'	Field Container	Williams	2008	Over the top	No injury or growth reduction at 100, 200 and 300 lb per acre	20081030h.pdf
27254	Yew	Taxus sp.	T. x media 'Runyun'	Field Container	Mathers	2008	Over the top	No significant injury at 2.1, significant at 4.2 and 6.3 lb ai per acre	20081030n.pdf
27262	Arborvitae	Thuja sp.	T. occidentalis 'Degroot Spire'	Field Container	Boydston	2008	Over the top	No injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20090129c.pdf
27262	Arborvitae	Thuja sp.	T. occidentalis 'Smaragd'	Field Container	Harvey	2008	Over the top	No injury at 2.1, 4.2 and 6.3 lb ai per acre	20080924e.pdf
27271	Arrowwood	Viburnum sp.	'Northern Burgundy'	Field Container	Boydston	2008	Over the top	No injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20090129c.pdf
27271	Arrowwood	Viburnum sp.	V. dentatum 'Blue Muffin'	Field Container	Reding	2008	Over the top	No injury and no significant difference in growth or marketability at 2.1, 4.2 and 6.3 lb ai per acre	20081223a.pdf
27271	Arrowwood	Viburnum sp.	V. rhytidophyllum 'Dart's Duke'	Field Container	Beste/Frank	2008	Over the top	No significant injury or growth reduction at 2.1, 4.2 and 6.3 lb ai per acre; all plants marketable	20090316j.pdf
27271	Arrowwood	Viburnum sp.	V. x burkwoodii	Field Container	Senesac	2008	Over the top	No injury or growth reduction at 2.13, 4.26 and 6.39 lb ai per acre	20081219d.pdf
27271	Arrowwood	Viburnum sp.	V. x 'Juddi'	Field Container	Mickelbart	2008	Over the top	No injury at 2.1, 4.2, and 6.3 lb ai per acre with single application 6 weeks after transplanting.	20081029a.pdf

Label Suggestions

If Syngenta develops a label for EXC3898 for use on or around ornamental horticulture plants, it is suggested that the initial label(s) be quite restrictive with over-the-top applications along with fully listing those species exhibiting sensitivity to treatment.

Appendix 1: Protocol

2008/2009 Crop Safety with Over-the-top Applications of Select Herbicide Materials

Final Draft

Ornamental Protocol Number: 08-010

Objective: Determine phytotoxicity of BAS 656EC, BAS 659G, Broadstar 0.25G VC1604, Mesotrione G, and V-10161 G to woody ornamental plants and BAS 659G on herbaceous perennials.

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: Depending upon research site and plant materials, various experiments can be established. Two applications are to be made approximately 6 weeks apart, with the first application within 7 days after potting, preferable between 24 and 48 hours. However, plant materials must have broken dormancy prior to first application. See notes below for Broadstar New Formulation. For liquid applications, use a minimum of 20 gal per acre. Applications should be made over the top of the plants using application equipment consistent with conventional commercial equipment. For all materials, target dry foliage. If dew is present at the time of application, note it. Irrigate with ½ inch water between 1 and 4 hours after application. Note: Liquid materials need at least 1 hour drying time prior to irrigation.

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 only. 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.

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
BAS 656h 63.9%EC (dimethenamid-p)	21 fl oz per acre (0.97 lb ai)	Woody ornamentals only	BASF, Kathie Kalmowitz, 919-270-4592, kathie.kalmowitz@basf.com
	42 fl oz per acre (1.94 lb ai)		
	84 fl oz per acre (3.88 lb ai)		
BAS 659h 1.75G (dimethenamid-p + pendimethalin)	150 lb per acre (2.65 lb ai)		BASF, Kathie Kalmowitz, 919-270-4592, kathie.kalmowitz@basf.com
	300 lb per acre (5.3 lb ai)		
	600 lb per acre (10.6 lb ai)		
Broadstar 0.25G VC1604	150 lb per acre (0.375 lb ai)	Do not apply at the first application timing within 7 days after potting; <i>only apply at the second application timing.</i>	Valent, Joe Chamberlin, 770-985-0303, jcham@valent.com
	300 lb per acre (0.75 lb ai)		
	600 lb per acre (1.5 lb ai)		
Mesotrione G	100 lb product per acre (2.1 lb ai/A)	Woody ornamentals only	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechsigl@syngenta.com
	200 lb product per acre (4.2 lb ai/A)		
	300 lb product per acre (6.3 lb ai/A)		
V-10142 0.5G	150 lb per acre (0.75 lb ai/acre)		Valent, Joe Chamberlin, 770-985-0303, jcham@valent.com
	300 lb per acre (1.5 lb ai/acre)		
	600 lb per acre (3.0 lb ai/acre)		
Untreated	--	--	

Reports:

Reports submitted electronically 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, 681 US Hwy 1 S, North Brunswick, NJ 08902-3390, Phone 732-932-9575 x4629, 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: 3/4/08

Revised By: CLP

Appendix 2: Contributing Researchers

Dr. Ed Beste	University of Maryland LESREC – Salisbury Facility 27664 Nanticoke Road Salisbury, MD 21801
Dr. Rick Boydston	USDA-ARS IAREC Rt 2 Box 2953-A Prosser, WA 99350
Mr. Luke Case	The Ohio State University Dept. Hort. and Crop Science 2001 Fyffe Ct. Columbus, OH 43210
Dr. Jeffrey Derr	Hampton Roads Ag. Exp. Station 1444 Diamond Springs Road, Virginia Beach, VA 23455
Mr. Ben Fraelich	USDA-ARS CPES P.O. Box 748 Tifton, GA 31793
Dr. Ray Frank	6916 Boyers Mill Road New Market, MD 21774
Mr. Tom Freiburger	Rutgers University Cream Ridge Experiment Station 283 Rt. 539 Cream Ridge, NJ 08514
Dr. Charles Gilliam	Auburn University Department of Horticulture 101 Funchess Hall Auburn, AL 36849
Mr. Paul Harvey	USDA-ARS 5230 Konnawac Pass Road Wapato, WA, 98951

Dr. Jim Klett	Colorado State University Department of Horticulture and Landscape Architecture Fort Collins, CO 80523
Dr. Heiner Lieth	Department of Plant Sciences University of California One Shield Avenue Davis, CA 95616
Dr. Hannah Mathers	The Ohio State University Dept. Hort. and Crop Science 2001 Fyffe Ct. Columbus, OH 43210
Dr. Michael Reding	USDA-ARS Hort Insects Lab 1680 Madison Ave. Wooster, OH, 44691
Dr. Andy Senesac	Long Island Horticultural Research Laboratory 39 Sound Avenue Riverhead, NY 11901
Dr. Brian Trader	Mississippi State University 158 Dorman Hall, Box 9555 Mississippi State, MS 39762
Mr. Buzz Uber	Crop Inspection Service 31130 Hilltop Drive Valley Center, CA 92082
Mr. Paul Wade	USDA-ARS US Vegetable Laboratory 2700 Savannah Highway Charleston, SC 29414
Dr. David Williams	University of Illinois PSL, 1201 S. Dornier Urbana, IL 61801

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.